



VOL. XXX.

CLEVELAND, O., SEPT. 29, 1904.

No. 13.

HOW THE VICTORIAN LOOKS.

As already detailed in the Review the steamer Victorian, the pioneer turbine vessel to engage in service on the Atlantic, was successfully launched last month from the yard of Work-



STERN VIEW OF THE VICTORIAN.

man, Clark & Co., Belfast, Ireland. The photographs which accompany this article are of great interest. The launching of this steamer marks an epoch in the evolution of the ocean greyhound, for apart from other considerations it is expected that the vessel will maintain a higher rate of speed, thus shortening considerably the passage between Liverpool, Montreal and Halifax. The Victorian is a most graceful vessel as may be noted from the lines of the photographs. The launch was successful in every particular. The Victorian will be the fastest steamer of the Allan Line and is, as noted, intended for the Canadian mail service. Her principal dimensions are:

Length, 540 ft.; breadth, 60 ft.; depth, 42 ft. 6 in. She will

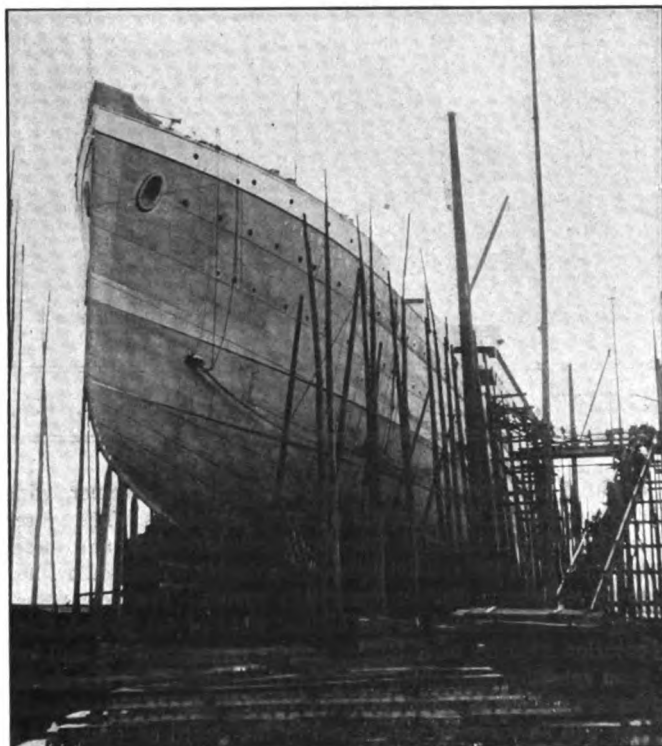
be fitted and equipped as a first-class Atlantic steamer, with accommodation for upwards of 1,300 passengers. The vessel is divided by bulkheads into eleven compartments, and these, together with the subdivisions of the double bottom, allow her to have twenty distinct watertight spaces. The new vessel has been constructed to the highest class of the British Corporation Registry of Shipping, and the strength of the hull has been specially augmented over the requirements of the classification society to meet the heavy swell of the North Atlantic. She will be surveyed and passed by the Board of Trade for a passenger certificate, and will also be fitted in conformity with the American laws for such steamers. First-class accommodation is provided in houses centrally situated on the bridge and promenade decks, and the distance between decks has been made higher than is usually the case to allow of large and lofty staterooms, arranged to accommodate two and three persons, together with a number of self-contained suites of rooms. The dining saloons for the first class are placed—one at the fore end of the bridge, fitted with seating accommodation for 200 persons; the other at the after end of the bridge, with similar seating accommodation; while on the main deck is placed the second class saloon. The first class music room,



VICTORIAN IMMEDIATELY AFTER LAUNCHING.

library and writing rooms are at the fore end of the upper bridge, immediately above the forward dining saloon. The smoke room is a large oak-panelled apartment, situated at

the after end of the promenade deck, with the floor, as in the dining saloons, laid with parquetry. Second class passengers are accommodated in four berth rooms on the upper and main decks amidships. The music room for this class is placed at



VICTORIAN ON THE STOCKS.

the after end of the bridge deck; is handsomely furnished and upholstered, and the walls are paneled in polished hardwood. The third class accommodation is arranged in the upper and lower 'tween decks, in four, five, and six berth cabins, all fitted with patent spring-bottomed beds. Dining saloons, sitting room, music room, and smoke rooms have also been fitted for the sole use of the third class passengers. It will interest intending travelers in these days, when there is that restless and insatiable desire for news, to know that the Marconi telegraphic appliances have been fitted on board, and, in harmony with this innovation, so far as the Canadian mail boats are concerned, there is also provided a complete printing outfit and printing press. The heating arrangements are designed on the most approved principle; and in all the public rooms and passages numerous radiators of elegant design are set up. The ship is also fitted with a first-class installation of electric light, the generating power for which is provided by means of three electric engines and dynamos; while mechanical ventilation of the most modern type is fitted throughout the steamer.

Although the Victorian can deal with such a large complement of passengers, there is still space available for almost 8,000 tons of cargo, and the facilities for its rapid handling and discharge are of the most efficient kind. On both masts are arranged four large derricks, each capable of lifting up to seven tons, and these, along with two crane port derricks, make ten in all, for the working of which ten double-cylinder steam winches are supplied. Special attention has been given to the arrangement of the cargo holds; and the ordinary round pillar supports for the decks have been largely discarded in favor of special girders and struts, which leave the holds free for the reception, storage, and discharge of cargo. Insulated chambers for the carriage of fruit and dairy produce from Canada are provided, in conjunction with refrigerating plant on the cold air circulation system. The vessel has also

sufficient bunker space for the double journey, with an extra allowance of several days in the event of any unforeseen delay, thus obviating all fear of a shortage of fuel.

The foregoing description of the internal features of the ship cannot under the circumstances do her justice. It is one thing to describe the nature of the accommodation, and another to give an adequate idea of its comfort and luxury. The distinguishing feature of the apartments provided for passengers is ample space, perfect ventilation, and the liberal use of the latest patents and ideas calculated to make the voyager even regret that the passage is so short. It is not so long ago that a trip to Canada or the States was something of an ordeal; to-day it is a luxury. Anyone who takes a run through the Victorian when finished will be surprised. Although no pretensions are made of having constructed a floating palace, at the same time no pains have been spared to make her as near perfection from the traveler's point of view as possible. Looked at as she lies in the water, her great height detracts in some degree from her length, making her appear shorter than she really is; but the graceful hull does not suffer from the air of altitude she possesses. There are no fewer than seven decks in the vessel, yet there is no suggestion of top-heaviness, and she is certain to prove a good sea boat in every respect. One might hazard the opinion that great efforts have been made, even at some sacrifice in other directions, to make the passengers more comfortable than on any steamer of her size, and so well matured and complete have been the plans for her construction that within ten months from the laying of the keel she has been successfully launched.

It was originally intended that the Victorian should be driven by reciprocating engines, but not long after the building had commenced Messrs. Allan decided to give turbines a trial. Some structural alterations were rendered necessary by this change of plan, but this presented no difficulty to the builders. What was less easily accomplished was the task of constructing the turbines, which, by the way, are the largest ever made. With characteristic energy the firm set to work, and within a very short space of time the necessary arrangements had been made at Messrs. Parsons & Co. for the use of their patents. This was adopted as the one there is the greatest amount of experience with in both naval and mercantile ships. The builders having acquired the right to build and equip vessels with the Parsons turbine, at once laid down the required plant, so that the utilization of this engine for passenger and cargo steamers is certain to be rapidly developed in their hands. A great impetus will be given to this new branch of engineering if the Victorian—as we hope she will—turns out a success. The turbine can legitimately claim that, as compared with the reciprocating engine, there is a saving of weight, cost, space, attendance, and upkeep; a complete absence of vibration; a reduced diameter of propellers, giving greater immersion; and an increase of speed, owing to a smaller steam consumption; while the smooth, continuous action of the turbine, with no rubbing surfaces and no thrust friction (for the thrust is taken by the steam itself) makes it an ideal marine engine.

A special design has been adopted of three shafts, with one propeller on each, the high-pressure engine driving the center propeller, while the low pressures are attached to the outside shafts. The parallel flow is the type of turbine used, the general course of the steam through them being parallel to the axis of rotation. Avoiding so far as possible technicalities, which always weary and perplex the lay mind, a turbine engine is a fixed cylinder, upon the inside surface of which are mounted rings of brass blades projecting radially inwards. Inside this revolves a drum armed on its outer surface with similar rings of blades set at an angle to the fixed blades, and arranged so that they are sandwiched between those of the fixed cylinder. Steam is admitted at one end of the turbine and passes through longitudinally in a zig-zag path, being deflected from the fixed rows of blades in the turbine casing

against the rows of blades on the drum, causing the latter, which is built on the propeller shafting, to revolve, and thus drive the propeller. The "fixed blades" (those in the cylinder) act as guides to deliver the steam with proper direction and velocity against the "moving blades" (those on the drum). Thus the full power of the steam is utilized, and in a direct and continuous way. The term "blades" when used in connection with the machinery of an ocean liner seems to suggest a screw propeller or something equally formidable. But these turbine blades are surprisingly small—no larger than a lady's little finger. Their number, however, is prodigious, there being no less than a million and a half separate pieces used in the blading of the three turbines of the *Victorian*.

The center propeller moves only in one direction; but two reversing turbines have been placed in the low-pressure casings, enabling the vessel to go astern when required, and here it should be remembered that, croakings to the contrary, the turbine claims a great superiority over the reciprocating engine in its power to stop a ship quickly. The peculiar construction of the blades exercises, when the turbines are rotating in a contrary action to the steam which is passing through them, a turning moment, two or three times as great as the turning moment when the engines are running in the direction they were made for; whereas in a piston engine there is practically the same force whether the engine is going with the steam or against it. A notable proof of this was seen when the turbine steamer *Queen*, when going at 19 knots, was stopped in two and a half times her own length.

It is a most interesting sight to visit the special engine shop where the turbines are being made. One would scarcely believe that the slender blades fixed to the ponderous casing drum on each of the low-pressure turbines would propel such a big ship, even at the slowest speed, or rather supply the propellers with the necessary propulsive energy. It is expected, however, or indeed looked upon as certain, that the speed of the *Victorian* will be a great advance on that of any other steamer on the same route, and it is confidently expected that, under favorable conditions, the voyage to Canada will be shortened by over a day, so that this vessel will prove an important item in the development of colonial trade. One reason for anticipating a good speed is the fact that the energy of the steam is used up to the last fraction in its passage through the turbine. There is also a marked absence of the vibration caused in ordinary steamers by the old reciprocating engines, which pound away for dear life, and shake the vessel from stem to stern. Anyone who has traveled in ocean-going "fliers" will recall with mixed feelings the eternal throb not only of the screws but also of every portion of the hull. This distressing vibration is at times particularly irritating, and there is no escape from it except perhaps for a short time, should a bearing become over-heated, and then the ship rolls about until matters are put right. The banishment of these unbalanced forces will, in the case of the turbine, very much enhance the pleasure of an Atlantic trip, and make what was once a source of dread a genuine pleasure. By those who think nervously of a possible breakdown in mid-ocean the Parsons' invention will be warmly welcomed. There are no moving parts to break or get out of order. Generally speaking, it is the fracture of a crank shaft, connecting rod, or some other vital portion of the machinery that causes these mishaps; but where the steam acts directly, driving the shafts of the ship evenly, the strain is very materially reduced as compared with engines which have to endure the stress to which the ordinary marine type are subjected.

Thus everything would appear to be in favor of the *Victorian*, and her maiden voyage will be watched with more than ordinary interest by the mercantile world. The naval authorities, too, will doubtless keep a watchful and attentive eye upon her performances, for it would appear that the turbine is an ideal type of engine for warships. Situated away down in the

bed of the ship they are as remote as possible from the damage caused by high-velocity projectiles, while economy of space leaves greater room for the offensive working of the ship. This saving is apparent in the vessel under notice, and it has been utilized for the advantage of the passengers of all classes. Instead of endeavoring to fill the ship choc-a-block with passengers, air space and comfort have been aimed at, and possibly no other steamer afloat today has such accommodation for the third class. It is certainly comfortable enough, while the reputation of the company in the matter of catering is too well known to require any further remarks under this head. No secret is made of the fact that the *Victorian* is largely an experimental ship, but everything points to the fact that she is one of those experiments which carry in themselves the secret of success.

LAUNCH OF SUCTION DREDGE CAUCUS.

The James Reilly Repair & Supply Co. of New York launched the second of the two large sea-going suction dredges for the United States government at the Greenport yard, Greenport, L. I., at noon on Saturday last. The vessel was christened the *Caucus* by Miss Anna M. Bowman, daughter of Mr. M. K. Bowman, manager of the Reilly Co. The two vessels, which have been under construction for the past twelve months, are intended to remove the sand from the mouth of the St. John's river, Fla., and also the harbor of Pensacola, Fla. These vessels are of a type which has sprung into use during the last few years to meet conditions where the ordinary dredging apparatus would be entirely inadequate. In order to combat the inroads of the sea it is necessary to handle very large quantities of sand, and therefore high powered machinery is absolutely essential. In appearance the vessels resemble a coasting steamship, with the addition that on each side of the vessel there is located a large tube, swiveling amidship, which tubes are lowered or inclined so that the free ends, fitted with heavy scraper nozzles, will drag on the bottom. The vessel is then propelled under her own steam at a moderate speed, and large centrifugal sand pumps in the vessel draw the sand mixed with the water and discharge it into the main body of the vessel, the forward and after holds of which are arranged to receive the sand. When the compartments holding 1,600 tons are filled, which operation takes only a time of about forty-five minutes, the tubes are drawn up and the vessel proceeds to sea where the sand is discharged by means of numerous sluices in the bottom of the hull.

The hulls of the vessels are built of heavy timber in order to stand the racking strain due to frequent grounding on the sand. They are 200 ft. long, 40 ft. beam, and 23 ft. 2 in. in depth, and are fitted with two large Scotch boilers of about 2,000 H. P. capacity. The propelling engines are of the vertical inverted compound type of about 1,200 H. P. capacity. The sand pumping machinery on one vessel consists of two centrifugal pumps each driven by a vertical compound engine of about 700 H. P. capacity, each pump being connected to one of the aforementioned suction tubes. Each vessel has the usual auxiliary machinery fitted to regular steamships and carries a crew of thirty-six men.

The navy department has been informed that the cruiser *Tacoma* has arrived at Rio Janeiro, having cruised from San Francisco down the west coast to South America around the Brazilian port in search of the missing merchant marine *Conemaugh*. The *Tacoma* failed to find any trace of the *Conemaugh* which has now been missing for several months.

The cylinder head of the steamer *Ogemaw* blew off in Lake Huron off Au Sable last week. The *Ogemaw* was picked up shortly afterwards by the steamer *Langell Boys* and towed to West Bay City.

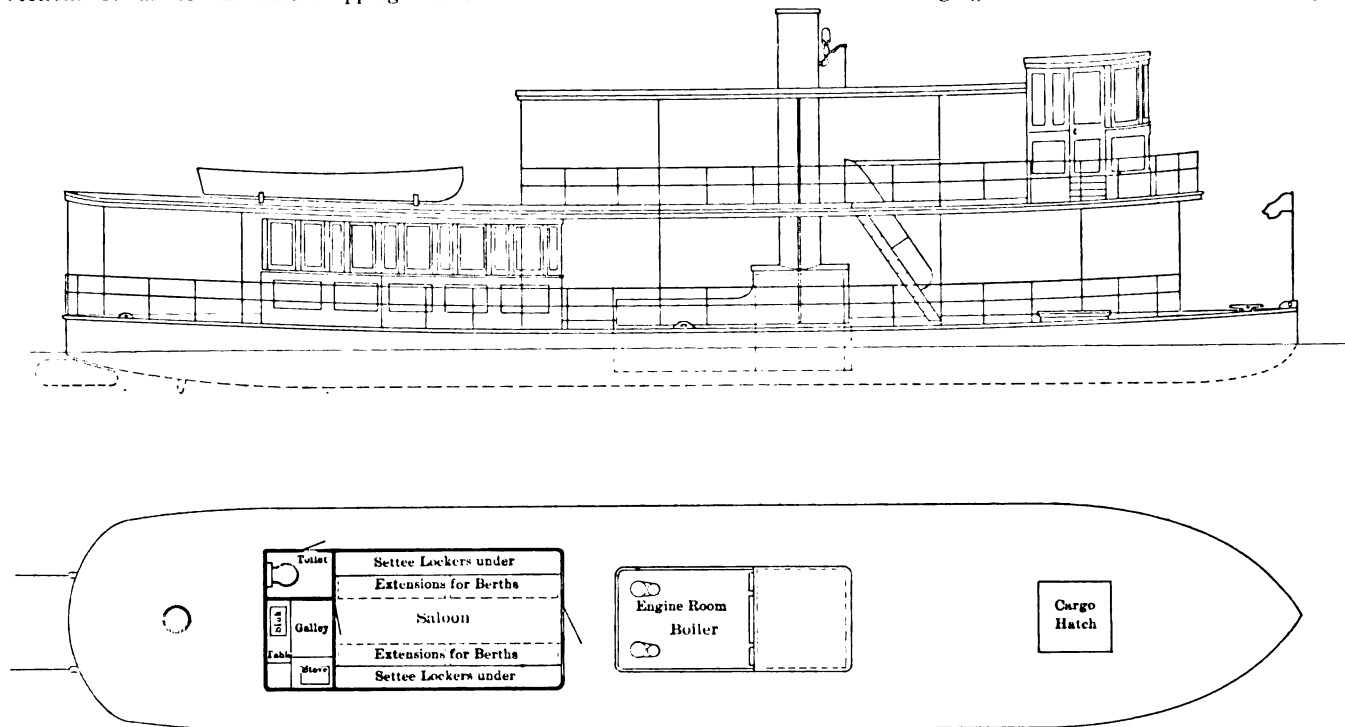
SHALLOW-DRAUGHT STEAMER FOR MEXICO.

The Racine Boat Mfg. Co., Muskegon, Mich., is building a twin-screw, shallow-draught steamer for service in Mexico. The steamer will be 70 ft. over all, 13 ft. moulded beam, 14 ft. extra beam and will have a draught, when loaded with 15 tons, of 26 in. The hull will be of steel and will be built in sections to facilitate shipping, as it is to be erected at the port of destination. All shell plates will be galvanized and the deck will be of 2-in. southern pine made over steel beams. The cabin will be built entirely of clear southern cypress and will comprise a small toilet room, galley and saloon, as shown on the diagram, and like the hull will be built in suitable sections so as to facilitate shipping. The saloon will be

RACING LAUNCH NAPIER II.

Considerable interest attaches to Mr. S. F. Edge's new racing launch Napier II. While she is essentially a speed launch she is built in a most substantial manner. The hull was designed and built by Yarrow & Co. at Poplar and the engines were supplied by D. Napier & Son of Acton, the whole work being carried out under S. F. Edges, Ltd., 14 New Burlington street, London, W. The launch is 40 ft. over all, 30 ft. water line and 15 ft. beam.

The hull is constructed of steel throughout, varying in thickness from 16 B. W. G. to 20 B. W. G., in accordance with the circumstances. The decks are steel, and the rudder and "A" brackets are steel forgings. The motors, which are Napier



TWIN-SCREW, SHALLOW-DRAUGHT STEAMER FOR MEXICO.

arranged with long settees on either side which will be provided with extensions to give sleeping accommodations to the crew.

As will be noted from the drawing the machinery is set approximately amidships in an opening through the deck surrounded by a steel coaming 25 in. in length. This coaming extends over the boiler, forming a complete hood and supports the outside smoke stack. The machinery equipment consists of a pair of fore and aft high-speed compound engines operating twin screws, water-tube boiler and all the necessary appliances to fit the boat for salt water work. The engines will have cylinder dimensions of 9 in. with a common stroke of 6 in. The condenser will be of a sectional out-board type with copper tubes brazed into naval bronze headers with suitable connections passing through the hull to receive the exhaust from engines and pump suction. The condenser will be hung in such a manner as to be thoroughly protected by the hull and is placed in the forward end of the tunnels.

The upper deck will be built of clear white cedar laid over white oak beams and supported upon stanchions with suitable girders and stiffeners. The entire upper deck will be enclosed with a double pipe railing.

Passengers on the upper deck will be protected from the rays of the sun by a light sun shade made of cedar and laid over oak beams, supported on stanchions. The steamer will have a complete equipment of life saving apparatus and tenders and her home port will be Frantera, Mexico. The owners have named the craft Macuspana.

marine-racing type, of 73 H. P., are carried on a substantial girder run fore and aft of the boat, and are also attached to the side of the boat on special frames. Thus the boat and motors are absolutely tied together, and experience has demonstrated that this method of securing motors and thrust block is quite satisfactory. The reverse gear for the starboard engine (the boat is fitted with twin screws) and the thrust bearings of both engines are in metal box-shaped casings, also secured to the engine girders. These boxes are filled with oil, and are quite watertight, which enables the bearings, especially the thrust bearing, to run entirely submerged in oil. The engines are connected to the shaft by Napier metal to metal marine clutches, which run in oil, and are operated by pedals, actuated by the steersman, thus giving him entire control of the launch. The exhaust is the Napier water-jacketed exhaust system, and the exhaust receivers and pipes are quite cool throughout their whole length.

The after-part of the boat is bulkheaded off, and the exhaust pipes terminate through this bulkhead, and the exhaust gases, in the form of cooled vapor, emerge from two cowls without any noise, which is of great advantage both to spectators and operators of a racing launch, and moreover prevents the boat from being absolutely impracticable on account of the noise.

The water is circulated by two pumps for each engine, which, by means of transfer pipes and cocks, can be connected together should one circuit go wrong. One pump serves to supply the water-jacket of the engine and the other pump sup-

plies the water-jacketed exhaust. Besides these pumps, auxiliary hand pumps are fitted, which can be brought into play immediately by simply operating them.

The store of petrol is contained in a water-jacketed tank carried in the after-part of the boat, and a supply tank is carried forward. The petrol is pumped up from the store tank to the supply tank by a hand pump, and the overflow runs back to the store tank and indicates when it is doing so in a gauge. The lubrication is triplicate, drip feed, splash, and forced lubrication being in operation at the same time. Thus all bearings have three distinct methods of being supplied with oil. The lubricant is contained in a store tank and is pumped to feed wherever it may be required, pipes from a distributor leading to the various points.

The steering acts direct from the wheel to the rudder quadrant, without any intermediate pulleys or turns in the wire. This gives practically the same thing as tiller steering, and is extremely sensitive in operation. All regulators and instruments are brought to instrument boards attached to the engine, and everything is to the hand of the driver, and the two engines can be manipulated to a nicety and the boat steered if required independent of the rudder.

A new system of automatic bilge-ejection has been fitted, which is capable of dealing with vast quantities of water with very little expenditure of power, and which is quite automatic. Although this vessel is strictly a racing machine, every provision has been made to enable the boat to make protracted runs at full speed, and she has been well and substantially constructed to stand heavy weather at high speeds, and she is in no way a short-distance sprinting craft. The engines are fitted with Napier synchronised ignition, and are started by means of turning on a switch. Either engine could be started by the other.

The general lines of the boat are a straight sheer line falling from the stem to the stern. Ample turtle deck forward, and a nearly flat deck aft, the tumble-home top sides aft, and the substantial wall-sided bow, give one the impression of stability and speed. The boat is painted entirely invisible grey, and has no decorations whatever except her ensign and burgee.

CANADA'S LIST OF VESSELS.

The department of marine of the Dominion government has issued the list of vessels remaining on the registry books of the Dominion corrected to Dec. 31, 1903. The total number of vessels remaining on the register books, including old and new vessels, sailing vessels, steamers and barges, was 7,020, measuring 683,147 tons register tonnage, being an increase of 184 vessels, and an increase of 30,534 tons register, as compared with 1902. The number of steamers on the registry books on the same date was 2,419, with a gross tonnage of 338,251 tons. Assuming the average value to be \$30 per ton, the value of the registered tonnage of Canada on Dec. 31 last would be \$20,494,410, against \$19,578,390 on same date 1902. Following is a summary showing the number of vessels and their tonnage by provinces:—

	Sailing ships and steamers.	Steamers.	Gross tonnage steamers.	Net tonnage of sailing ships and steamers.
New Brunswick	929	136	10,523	59,508
Nova Scotia	2,060	184	22,418	216,053
Quebec	1,288	373	82,875	138,570
Ontario	1,778	1,109	141,801	169,086
P. E. Island	164	17	2,375	13,739
British Columbia	639	391	67,620	76,215
Manitoba	139	97	7,263	7,695
Yukon District	14	13	3,376	2,281
Grand Total	7,020	2,419	338,251	683,147

There are seventy-seven ports of registry in the Dominion, an increase of two in the year, distributed as follows: Ontario, thirty-eight; Nova Scotia, twenty-one; New Brunswick, seven; Quebec, five; British Columbia, three; Prince Edward Island, Manitoba, and Yukon Territory, one each. The two ports added during the year are Fort William and Midland, Ont. Since these returns were made up the registry office at Port Rowan, Ont., has been closed and the records transferred to Simcoe, where the collector's office is situated. Quebec city still retains its position as the port where the greatest number of vessels are registered, the number being 640 against 654 in 1902, while Montreal has the largest tonnage, 94,526, against 91,347 in 1902. Toronto has the largest number of steamers on her registry, 255, against 240 in 1902; Montreal comes second with 217 steamers, and Ottawa third with 204; the tonnage of the 217 Montreal steamers being nearly double that of the 205 at Toronto.

The number of new vessels built and registered in the Dominion during the year was 328, measuring 30,323 tons register tonnage. Estimating the value of the new tonnage at \$45 per ton, it gives a total value of \$1,364,535 for new vessels. The new vessels were built and registered as follows:

	Vessels	Tons.
New Brunswick	24	1,708
Nova Scotia	135	12,907
Quebec	31	1,076
Ontario	71	10,719
Prince Edward Island	6	171
British Columbia	56	3,494
Manitoba	5	248
Yukon District	Nil.	Nil
Total	328	30,323

A table is also given showing that during 1902 the names of nineteen vessels were changed at eleven ports.

In point of ownership of net tonnage Canada stands eighth among the nations, those having over 100,000 tons being as follows:

	Tons.
British, including Canada and the colonies.....	11,014,790
United States	2,600,048
German	2,254,308
Norwegian	1,352,725
French	1,156,170
Italian	977,515
Russian	919,864
Canadian	683,147
Swedish	609,208
Spanish	548,199
Japanese	523,389
Dutch	493,506
Danish	427,472
Grecian	374,409
Austrian	370,222
Turkish	240,638
Brazilian	157,106
Belgian	108,553

The Bertram Engine Works Co., Toronto, is building the steel hull for a ferry for the St. John, N. B., city council. The steamer is 140 ft. over all, 114 ft. long from stem to stern post, 34 ft. beam, 49 ft. over guards and 13 ft. deep. She will be built similar to ferry boats on the East and Hudson rivers at New York. When ready for shipment it will take twenty cars to transport her to St. John. She will have double propeller with accommodation for passengers on guards and two open wagon roads, one on each side of the center. The Phoenix Iron Works of St. John is building the engines and boilers and will do the carpenter and joiner work.

OCEAN LINER ROUTINE—TURBINE NOTES.

Comdr. Walter E. Worthington, of the United States navy, has contributed a very interesting article to the Journal of the Society of Naval Engineers upon his observations during a recent trip abroad. He says:

"The writer, recently having had occasion to travel in two of the fast Atlantic liners, visiting several of the ship yards on the Clyde, the birthplace of marine engines as well as most of the important improvements in the same, meeting chief engineers, ship owners, ship builders and inventors, jotted down these notes on items of interest for his own use. At the suggestion of the secretary-treasurer of the American Society of Naval Engineers these random comments are offered to the members, hoping they may prove of some interest. On one of the ships the routine is as follows: Reaching Liverpool Saturday morning, the company's agent comes on board at once to find out what stores are wanted. These he gets from the company's storehouse and delivers them on board Tuesday morning. The chief engineer has no anxiety concerning the stores, and has but to give the agent a list of what he wants, not being required to expend time and energy in following up requisitions. The company supplies whatever is asked for, but the presumption is that the chief engineer would lose his place if he abused this privilege. The cylinders are opened and oiled.

"On the same afternoon the boilers are blown down with the surface blow to the bottom of the glass, the steam pressure having been reduced previously to 60 lbs. from the working pressure of 160 lbs. The boilers then stand until Sunday night, when they are pumped out. Monday they are opened and cleaned, Tuesday they are closed and filled with 50 tons of fresh water each and 10 pounds of soda ash (equal in strength to 148 pounds sal-soda). Saturday and Sunday are utilized for cleaning. The whole of Monday and the forenoon of Tuesday are devoted to overhauling, in which the whole engineer's force assists. Tuesday noon the most of the firemen and coal passers are paid off, and they then have leave of absence until the following Saturday, when they rejoin. The ship sails Saturday, late in the afternoon.

"The engineers and oilers remain to work with the shore gang which comes on board to do all the necessary overhauling, and get leave only when their services can be spared. Each assistant engineer gets one day off every two weeks; one week's leave each summer and an additional week each winter. During the week in port, in addition to the necessary repairs and adjustments, occasion is taken to make the routine examinations of the machinery as required by the surveyors. Part of this is done each voyage, the work being so divided that the whole will be completed within the limit of time allowed. The owners of the vessel in question are extremely careful to avoid breakdowns or stoppages at sea, and it is stated that this vessel has not stopped at sea once through accident to machinery in the past six years; has made a voyage at full speed every other week, stopping one week in port at the end of each trip across and being laid up one to two months each winter.

"After a crank shaft or a section of line shaft has been in use eight years it is considered unreliable and is replaced by a new one. This process goes on continually, the working gang being so expert that they can remove and replace a section of shafting during a week's stay in port. The tail shafts, of course, must be renewed while in dock, when the ship is laid up during the winter. The boiler braces are protected by painting with a mixture of white zinc and paraffine of the grade used in England as lamp oil. Two coats are applied, allowing the first to dry before applying the second. The same is used with good results for painting the interior of evaporator shells.

"Zinc is used in the boilers, though it has been found that a smaller quantity is required since the use of soda was be-

gun. The boiler tubes of this vessel have been in use ten years and are still good with the exception of a few tubes. The condenser tubes have also lasted ten years and are still good. Another vessel of the same line has been in constant use for twenty years without a complete retubing of her boilers, although a number of tubes have been renewed from time to time. This latter vessel has no evaporator and uses sea water for her make-up feed. No soda was used until about two years ago.

"The main feed pump works from the main engines.

"Preparatory to sailing, the bottoms of the cylinders are painted with white zinc mixed with paraffine. This does not readily turn yellow and can be scraped off easily when repainting is required. The tops of the cylinders are painted with a mixture of soda in water with a little bath brick powder added, instead of using white lead and tallow. It withstands the action of sea water, looks white and can be wiped off readily on arrival in port, leaving the metal bright and clean. The 'United States' metallic packing is used for the main piston rods as well as for valve stems and other smaller rods, and even for the piston rods of the compressor for the ammonia ice machine. Before the introduction of this packing the piston rods of the main engine wore so badly that they had to be renewed every two or three years. On this and several steamers visited by the writer the regular practice is to have the line shaft bearings lubricated by grease cups.

"On the ship in question it is the practice, after having filled the boilers with the mixture of 50 tons of water and 10 lbs. soda ash each, to allow this to stand twenty-four hours. It is then tested with a simple apparatus, of German invention, constructed on the same principle as the apparatus furnished by the Babcock & Wilcox Co. for use with their boilers. Enough soda ash is then added to bring the density up to one ounce of soda per ton of water. When at sea, and when the engines are developing about 28,000 I. H. P., 75 pounds of soda ash are used each twenty-four hours. The 75 pounds of soda ash are mixed with water and put into a tank, from which the solution is allowed to drip into the feed tank at such a rate that the whole is used by the expiration of the time.

"The surface blow is used once in twenty-four hours in each boiler, blowing down about 1½ in. in the glass, the boiler pressure being 160 lbs. The apparatus used for testing the alkalinity of the water also serves to show whether or not there is any oil in the water. Blowing is omitted, of course, should no oil be present.

"Each watch cleans one-half of its fires immediately upon coming on watch, the other half being cleaned as soon as the first half has burned up brightly. Ashes are hoisted by the watch on duty at the middle and again at the end of the watch. The firing on this and on a number of other merchant vessels visited by the writer, and which are run under natural draft, is no better than is found in the navy. In fact these ships could never maintain their high speed if it were not for the ample grate surface provided by the designers.

"The firing has been uniformly good on all merchant ships which the writer has seen running under artificial draft. It appears practically impossible for the average fireman continually to readjust the thickness of his fires to keep them right to suit a draft of air that is frequently changing in strength as the wind changes in force and direction, which occurs several times per day on the North Atlantic. On one ship dense black smoke came out of the after smoke pipe continually while very much lighter smoke came out of the forward pipe, indicating loss of heat from insufficient air aft and loss of heat from excess of air forward. Also the smoke was much denser at some times than at others, whereas with artificial draft a steady stream of uniform density is al-

ways seen. The firemen get a lunch of bread and tea before going on duty at 4 p. m., a heavy supper when they come off duty at 8 p. m. They also have a meat stew which they cook in the fireroom and eat when they come off duty at midnight and at 4 a. m.

"The firemen are not required to keep any account of the amount of coal they use. Chief engineers are agreed that such an account as they might keep would be of no value. After the ship has been at sea for two or three days an estimate is made of the bunkers. If, on account of head winds or for any other reason, the coal is found to be disappearing too fast, the number of revolutions of the engine is reduced by cutting off steam shorter in the H. P. cylinders. The amount of coal carried is just about sufficient for the voyage at normal speed, with a margin for safety.

"The 'Patent Log' is put over only occasionally, and is not towed all the way across. The captain checks his observations by the revolutions of the main engines, which are reported to him every twelve hours for that purpose. Thus the errors in coal account and in the records of the patent log, which cause naval officers so much unnecessary fret and worry, are summarily disposed of.

"As the ship slows down to enter port a detergent is fed into the condensers and the latter allowed to get hot, losing the vacuum to a certain extent decided upon by experience. The main feed pump is stopped, and the black, greasy water delivered by the air pump into the feed tank is pumped overboard. Sponges and felt are used in the feed tanks. After the first twenty-four hours the sponges are found to be of but little use and the felt is little better.

"At the ship yards on the Clyde much interest is being manifested in the marine steam turbine. One ship builder said to the writer that he considered that the marine steam turbine had long since passed the experimental stage. He then proceeded to point out new machines that he was installing for special work in marine turbine engines, five medium-sized vessels on the stocks in which he was about to fit such engines, one in the water just receiving her machinery, and one which had just completed her trial trip, making seven in all. One of the vessels was to cruise as far as New Zealand. When the suggestion was made that there might be a risk in sending such comparatively untried engines so far from home, he stated that his firm guaranteed the results. He states that turbine engines effected a large saving in weight if properly designed, and that they also save somewhat in overhead space and a little in length, though not much in breadth.

"With regard to steering gear the general practice on the Clyde appeared to be to rely on the telemotor altogether and with no installation of the wire rope gear. Considering the frequency of the failures of the wire rope gears of our naval installations to act surely and properly, it would seem to be an excellent plan for our constructors to follow the Scotch builders.

"No visitor to the Clyde can afford to miss the opportunity of taking a trip on one of the new turbine steamers. Through the courtesy of the owners the writer was given the privilege of spending a day in the engine rooms and firerooms of the Queen while the vessel was under way, and of having his numerous questions answered by the chief engineer. The Queen Alexandra has been described so often in the pages of this journal, as well as elsewhere, that it is hardly necessary to say that she is the newer and the faster of the new turbine steamers built by Denny & Bros. of Dumbarton in 1902, to run on the Clyde from Greenock to Campbelltown during the summer months, touching at a number of points en route, going and returning.

"Her trial speed was 21¾ knots; length, 270 ft.; breadth, moulded, 32 ft.; depth to promenade deck, 18 ft. 7 in. She is fitted to accommodate 2,000 passengers. To make her schedule

time she steamed on this occasion at a speed of about 19 knots and notwithstanding the stops at five piers, reached Campbelltown on time to a minute, having left Greenock at 8:45 a. m. and having reached her destination at 12:30 p. m.

"The high-pressure turbine drives the center shaft at about 600 revolutions; the two low-pressure turbines, one on each side, run at 800 revolutions for 19¼ knots speed. There is but one screw on each shaft. The aggregate I. H. P. developed is 3,000 and the boiler pressure is limited to 150 lbs. Her owners have stated that the coal consumption is much less than that of a similar vessel fitted with triple-expansion engines, which they previously operated on the same service. The oil consumption is almost nothing, as the same oil is used over and over again; the total loss in three summers of about eighteen months' running having been but one gallon.

"The shafts when carefully gauged showed a wear of only one one-thousandth of an inch the first summer and nothing the second summer. The tool marks still remain in the thrust collars. Metallic packing is used for all stuffing boxes. 'Pope's Joint' is used for all steam and exhaust pipes. This consists essentially in faced flanges, scraped to fit and brought together under great pressure by a special contrivance. The lubricating oil for the main engine journals is forced into them under a pressure of about 5 lbs., works through the journal, and is then drained off into a settling tank. A special pump draws it up again and forces it into circulation. The journals are kept cool by a water jacket through which sea water is forced by a pump, the water being then delivered overboard. There is one main condenser on each side of the engine room close to its own low-pressure cylinder. The air pumps, two in number, are of the Edwards type without valves in the bucket and maintain a vacuum of from 27 to 28 in. No bilge pump is used as no water finds its way from the machinery to the bilges. All the steam exhaust from every auxiliary machine is used in the feed heater, keeping the feed water up to 200 degrees Fahr. The design of the feed heaters is such that the feed water travels three times through the heaters.

"The forced-draft blowers are placed close to the working platform together with the air-pressure gauges, all of which are tended by the engineer on watch, who maintains a steady pressure of one-half inch of water in the closed firerooms while under way. The blowers are large for the work required of them and run at a very low speed. The main feed pump is fitted with the automatic arrangement usual on British vessels for regulating the speed of the pump according to the amount of water in the feed tank. The stopping, backing and maneuvering of the engines was done quite as quickly and easily as could have been done with triple-expansion engines, all of the signals being answered promptly.

"The vacuum being constant, the speed called for was determined by the pressure shown on the gauge attached to the high-pressure valve chest, so that when, at any time, the captain signalled 'half speed' for example, he always got the same number of revolutions and there was no delay or mistake due to attempting to count revolutions. The engines were run entirely by the pressures indicated on the gauges. A dial and pointer were connected with each main engine shaft so that the direction and speed of the shaft could be observed if desired. In fact, that was the only way that one standing a short distance from the engines could know whether or not the engines were in use, as they made no noise whatever, and there was no sound of rushing steam, such as is heard in other engines.

"The work in the fireroom was perfect. Upon entering a fireroom a white light was seen to shine out from all the ash pits and from every one of the air holes in the furnace doors and fronts. Upon looking into the furnaces each was seen to have a layer of coal of the same depth, about five

inches thick and perfectly level from front to back. One fireman appeared to handle four fires without excessive labor. The draft being sufficient and constant, his work consisted almost entirely in putting on coal. The fires were cleaned at night. The work of the firemen was rendered even more than usually easy by the fact that the length of grates in the furnaces was only five feet.

"Without going into the details of the question of the relative economy of the triple-expansion and turbine engines, there is no doubt in the mind of the writer that a fair share of the economy claimed for this particular vessel is due to the perfection with which the details of the installation have been designed and carried out. With such regularity of firing, a high feed-water temperature, no steam leaks anywhere, no bilge pump, and very efficient types of air pumps, feed pumps and feed heaters, any plant would show exceptional results.

"As before stated, the signals from deck were answered promptly. There appeared to be, however, some slight deficiency in the backing powers, as the speed of the vessel was reduced (the revolutions of the turbines were reduced) some time before reaching the pier. At some of the piers it was difficult to get alongside, on account of their situation and also because of the direction of the wind, which was blowing strongly at the time. On the whole, the boat appeared to handle as well as the average of our river and bay steamers. The inventor of these turbines states that the backing power of the newer vessels of the Queen Alexandra class will be much increased, since it is found quite practicable to give a considerably larger area to the L. P. screws without reducing their efficiency when going ahead.

"During the visit to Wallsend-on-Tyne the writer had the pleasure of being shown through the Turbinia works, where marine steam turbines are made, the inventor, Hon. C. A. Parsons, himself, sparing his valuable time to act as guide. Turbines were seen in every stage of construction, and among them a set developing 10,000 I. H. P. and destined for installations which have been built or which are being built in these works encompass the outfit for twenty-eight vessels, although the advantages of turbines were first demonstrated by the little Turbinia in 1897.

"In conclusion it may be said that after reading much of what has been written both for and against the Parsons marine turbine, after many conversations with ship builders and others, and after seeing the turbine in operation, the writer is strongly inclined to believe that some form of turbine engine will soon be universally installed for all merchant vessels of 15 knots speed and over, and of not less than 3,000 I. H. P.

The advantage of turbine engines for the propulsion of all classes of war vessels are not so obvious as for their use in merchant ships, for the reason that the former cruise so much at low speed. To accomplish this economically involves the addition of cruising turbines or triple-expansion reciprocating engines, with a corresponding increase in weight, space and complexity of the plant. Nevertheless, when we consider the length of time our small gunboat destroyers and torpedo boats are laid up for repairs, and when we think how much longer the gunboats would be laid up if they were run frequently at high speed, which should be the practice if we expect to maintain efficiency in their material and personnel, and then consider a vessel fitted with turbine engines, which is not only theoretically but practically ready at all times to be run at any speed, and which is subject to almost no wear and tear, liable to no accident beyond the power of the force on board to repair, and even requiring no cleaning up on arrival in port, we cannot but feel that the time has come for us to follow the indication of the times and make a radical change at the earliest moment when opportunity offers in projected vessels of these types."

LIVERPOOL SHIPPING LETTER.

Liverpool, Sept. 19.—The reported retreat of the Continental lines in their race war with the Cunard Line has considerably relieved the tension which existed here among those engaged in the North Atlantic trade. According to a report from Hamburg the Continental lines trading with North America have agreed to stop carrying third-class passengers from the United States to Europe at the very low rates which have been in force for some time, and a similar decision has been come to by the affiliated British lines, the higher rates coming into operation today Sept. 19. This means, apparently that the Continental lines confess that their scheme for forcing the Cunard Line to come to terms has failed in, at least, one direction. The report, however, indicates that the struggle is to be directed more against the Cunard Austro-Hungarian Line, a further cut in the rates having been made in that trade. The effect of the decision to raise the eastward rates by Continental and affiliated British lines will it is thought be far reaching, and doubtless the Cunard company in due course will follow suit.

With regard to the Cunard Hungarian Line, the Hungarian minister of the interior has issued fresh regulations for the control of the Hungarian immigration movement. One of the most important clauses of these regulations provides that parties will only be given the necessary permission to emigrate when they travel by the Cunard Line from Fiume; further, the local authorities are instructed to discourage emigration as much as possible, but when it is found impossible to dissuade persons from their intention to emigrate, they are to be informed of the advantages of the Fiume route. The authorities are also directed to take energetic measures to seek out agents of other passenger lines which have no concession from the Hungarian government, and prosecute them as speedily as possible. The low westward rates to United States ports has caused the Canadian lines to make a further cut in their fares. While the lines running to the United States ports from Britain have for some time been carrying passengers for \$7, \$8.50 and \$10, the Canadian lines—the Allan, Canadian Pacific railway, and Dominion—wisely adhered to a \$15 fare, the belief being that there were very few, if any, emigrants who were desirous of reaching Canada, who would travel via the United States, even if they could save a few shillings by so doing. The lower rates to New York have, however, influenced traffic, with the result that the Canadian lines named have been reluctantly compelled to cut the already low rates of \$15 to \$10 for Quebec, whilst \$2.50 extra for railway fare will be charged for Montreal. These new rates will come into force next month.

In a Blue Book just issued by the Board of Trade, interesting statistics are given showing the progress of merchant shipping in the United Kingdom and the principal maritime countries. From the figures quoted it does not seem as if the pessimistic view held in some parts of Britain as to the decline of British shipping is confirmed by actual facts. For instance in 1903 the total tonnage of British vessels with cargoes and in ballast which were entered and cleared in the foreign trade at ports in the United Kingdom amounted to 69,211,973, this being an increase of over 4,000,000 tons on the previous year. The nearest approach to these figures was a rise in the twelve months of about 600,000 tons in German shipping, the totals being 6,178,338 and 5,610,161 tons respectively. Out of the 69,211,973 British tonnage, close upon 68,000,000 tons were of steam vessels. An increase is also reported of over 3,000,000 in tonnage of British vessels, entered and cleared at British ports with cargoes. On the other hand ship building in the United Kingdom has declined in tonnage by 200,000. In 1902, the tonnage built for home and the colonies was 800,374 tons, but the following year the figures were 629,069. The volume of trade in building for other countries was 129,308 tons, a decrease of about 20,000

tons on 1902, and of 70,000 tons on 1901. The total decline on 1901, in which year ship building, both for home, the colonies, and other countries, reached 983,133 tons, has been to the extent of 200,000 tons, but 1903 was a bad year for trade all round and ship building suffered in consequence.

The new arrangement between the Allan Line and the Grand Trunk Pacific railway, with reference to a transpacific service is on the same lines as that existing between the same companies for the transatlantic service, and will be worked by a special fleet of cargo and passenger steamers taking the whole of the westward traffic of the Grand Trunk company. It is estimated by the managers of the Allan Line that abundant freights will be offering from Canada to China and Japan to keep the line going.

Mr. Norman Hill, secretary of the Liverpool Steamship Owners' Association, has prepared an interesting comparison as to the number of steerage passengers which might be carried by one and the same vessel in the North Atlantic passenger service, according as she sailed under different flags. If flying the British flag, the total would be 930, under the Belgian flag, 1,127, German 1,203, Dutch 1,158, and American 1,127.

Messrs. R. P. Houston & Co. (Houston Line) have, since their interest in the South African trade was established in New York, been represented by Mr. Daniel Ripley, but the business of the line seems to have grown to such an extent as to warrant the firm setting up its own offices there. The following announcement has therefore been authorized to be made: Messrs. R. P. Houston & Co., of London and Liverpool beg to announce the opening of their own office in New York, and by mutual agreement with Mr. Daniel Ripley will take over the agency of the Houston Line to South Africa. Their offices will be in the Maritime building, No. 8 Bridge street.

The death has this week taken place of Mr. Michael Martin, the late general manager of the Leyland Line. Mr. Martin's early business life was spent with Messrs. Bibby, ship owners, from whose service he entered that of the Leyland Line in the accountant's department. In the course of time, he advanced until at the end of 1887 he was appointed to the general management of the company, a position he held until the Leyland Line was merged with the American Shipping Combination. For upwards of forty years, he was identified with the shipping trade of Liverpool, and at the time of his death, which took place very suddenly at his residence at Windermere, he was 68 years of age.

Messrs. Elders & Fyffes, Ltd., Manchester, have just placed orders for three new steamers for the carriage of bananas, two with Messrs. Workman & Clark, Belfast, and one with Messrs. Alexander Stephen & Sons, Glasgow. These steamers, with a measurement of 4,500 tons will each carry about 50,000 bunches of bananas in chilled air compartments.

Messrs. Fleming & Ferguson, Ltd., Paisley, have launched the first of two powerful ice breaking steamers which have been on order for the government of Canada. The vessel which is of special design and great structural strength is for service on the St. Lawrence, and is intended to extend the period beyond which the river has hitherto been navigable. The construction of the vessel has been under the superintendence of Capt. M. P. McElhinney.

This week, the Dufferin, the largest troopship for the Indian government, has also been launched from the yard of Messrs. Vickers, Sons and Maxim at Barrow. The Dufferin, which is 435 ft. long, is the largest troopship afloat, and can at short notice be converted into an armed cruiser, having eight 4.7 guns, and eight 3-pounder quick firers. There is accommodation for 1,250 officers and men with their wives and families. The speed of the vessel will be 18½ knots.

It is gratifying to learn that the prospects for the shipping season at New Orleans, now so close at hand, are looked upon

by those in the trade as more hopeful than last year. The winter wheat crop is said to be already harvested, whilst the cotton crop, notwithstanding adverse reports from other quarters, is considered as likely to be the largest on record. The tendency each year seems to be for the southern crops to find their way in increasing quantities to New Orleans for shipment to Europe. The Leyland Line's connection with New Orleans is, it is said, to be increased considerably this season. Already their trade from that port to Liverpool is a large one, as they despatch some six or seven steamers per month during the season, besides one or two per month to London and Antwerp. It is announced that two new services are to be inaugurated, one from New Orleans to Bremen, with two departures per month, and the other to Havre, with similar sailings.

The monthly approximate traffic return just issued by the Manchester Ship Canal Co., show the receipts for August to be \$172,620, compared with \$165,250 during August last year. The increased revenue for the eight months of the current year amounts to \$64,800.

FORMING THE NEW SHIP BUILDING COMPANY.

The plant of the Harlan & Hollingsworth Co., Wilmington, Del., is now the only one of the former properties of the United States Ship Building Co. that remains to be sold to the reorganization committee. Mr. Charles M. Schwab bought in the plant of the Union Iron Works at San Francisco this week for \$1,700,000. The bid was tendered by Mr. Francis Pollock representing the reorganization committee of the new ship building company and was the only bid made. Mr. Schwab says that as soon as the plant of the Harlan & Hollingsworth Co. is purchased a new \$33,000,000 company will be formed, of which \$3,000,000 will be bonds and the \$30,000,000 will be equally divided between preferred and common stock. He says that he will control 70 per cent of the stock of the new company, the most valuable asset, of course, of which will be the Bethlehem Steel Co.'s plant. He expects that the new company will do considerable business as he is looking forward to a revival of ship building in the United States as soon as the presidential campaign is over.

The Bertram Engine Works has just closed a contract with the Keewatin Lumbering & Manufacturing Co., Keewatin, Ont., for a tug of the following dimensions: Length over all, 95 ft.; length from stem to stern post, 86 ft.; beam, 19 ft.; depth, 10 ft. 4 in.; draught, 8 ft. 6 in. She will have a steel frame and a steel deck with oak bottom planking, four steel bulkheads and a steel deck house with quarters for officers. On top will be a steel Texas, a pilot house, and aft below the crew's quarters. The engine will be fore and aft compound condensing 14 and 28 by 20 in. built for a working pressure of 150 lbs. and turning a 7-ft. cast iron propeller wheel. The boiler will be of the Scotch return tubular type 10 ft. in diameter by 12 ft. long. This tug will be built at Toronto, taken apart for shipment and re-erected at Keewatin.

The schooner Margaret Thomas was launched from the yard of Washburn Bros., Thomaston, Me., last week and was named by Miss Elizabeth Washburn. The Margaret Thomas is the twenty-fifth vessel built by Washburn Bros. at Thomaston and is the fifth of the Thomas fleet. She is 102 ft. 8 in. keel, 40 ft. beam and 19 ft. 6 in. deep. Her frame is of solid Virginia oak. The planking is of southern pine 4¼ in. thick with ceiling of similar material 10 in. thick. Three full decks run the entire length of the vessel with four sets of hanging knees. The Hyde Windlass Co.'s engine and boiler were installed.



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Published every Thursday by

The Penton Publishing Company,
CLEVELAND, OHIO.

CLEVELAND:	WADE BUILDING.
CHICAGO:	MONADNOCK BUILDING.
DETROIT:	HAMMOND BUILDING.
NEW YORK:	150 NASSAU STREET.

*Correspondence on Marine Engineering, Ship Building and
Shipping Subjects Solicited.*

Subscription, \$3.00 per annum. To Foreign Countries, \$4.50.
Subscribers can have addresses changed at will.

The Cleveland News Co. will supply the trade with the MARINE REVIEW
through the regular channels of the American News Co.

Entered at the Post Office at Cleveland, Ohio, as
Second Class Matter.

SEPT. 29, 1904.

Congressman Littlefield in an address recently delivered in Maine, said that it was neither wise nor safe for the United States to be obliged to depend upon the transportation of its exports to foreign countries upon a foreign merchant marine.

The text book of the Democratic national committee is now out and it will be found that it devotes leading space to the consideration of the shipping question,—that is the state of American shipping in the foreign trade. It is quite evident that the committee has given considerable thought to the subject. Judge Parker in his letter of acceptance touched upon the question and deplored the present condition. In fact both Judge Parker and the Democratic committee deplore the state of affairs and suggest the remedy of discriminating duties. Opinions may differ as to the form of remedy but the essential thing is that both parties recognize that the country is stirred up on the question of shipping and is determined that something should be done to remedy its present state. Indeed, when one comes to think of it, there is no other question before the nation than the restoration of American shipping on the high seas. Certainly the money question is not an issue. The gold standard is irrevocably the standard of the country. The policy of protection could not be changed without grave disturbance and it is clear from the present plan of the

campaign that there is no intention to disturb it. Shipping, therefore, is the real issue.

The Democratic committee in its text book makes good use of the little red stickers scattered quite generally throughout the country by the Marine Review to the effect that American ships in the foreign trade have 100,000 tons less tonnage now than almost 100 years ago. Then we carried 90 per cent of our foreign trade; now we carry less than 9. This little sticker has virtually furnished the keynote for the Democratic text book, the gist of which upon the shipping question will be found in another column in this issue.

The present condition of the American merchant marine has been brought about by the neglect of the general government. Undoubtedly if the wisdom displayed by our forefathers had been continuously displayed since the United States became a nation the present deplorable condition would not exist. But shipping has been neglected for a period of almost fifty years and it cannot now regain its former state unless directly aided by the nation. It is useless to expect it to do so. The conditions which have operated to make this country supreme in manufactures have directly operated to destroy American shipping on the high seas.

Great Britain was not slow to seize upon its opportunity when steam supplanted sail as the motive power for vessels and when steel supplanted wood as the material for their construction. She possessed a natural advantage in the construction of iron ships because her coal, ore and lime stone beds lay close together while those of the United States were thousands of miles apart with extremely limited facilities for bringing them together.

The iron ship is a more economical vessel than the wooden ship because its life is longer, and Great Britain speedily became the ship building nation of the world. She recognized also the potential advantage of the steamer over the sailing ship and began definitely to subsidize steamers for the carrying of the mails to all parts of the globe. Mail lanes speedily become trade lanes. Manufacturers ship by those lines which are sure to reach certain ports at regular intervals and which can guarantee through connections. Britain is the only country in the world that can do this today. She is the only country whose steamers touch directly South American ports. American manufacturers cannot ship goods directly to South American ports because there is no line existing from this country. The goods have first to go to Liverpool and must be transhipped from that point in British steamers. Britain is now so absolutely supreme in the carrying of oversea commerce that it is absurd to speak of any other nation as being second to her. While the United States has a respectable tonnage, something like 6,000,000 tons, it is nearly all devoted to coastwise trade, only 888,776 being for-

eign. Britain has a tonnage of over 16,000,000, 14,000,000 tons of which are steamers whose potentiality is, as noted, greater than that of the sailing vessel, and which is almost wholly devoted to the foreign trade.

We repeat that it is useless for the United States to expect to compete with this overwhelming force unaided.

American ships cost more to build than British ships, owing to the protective tariff which has enhanced the price of materials and the scale of wages in this country. Owing to the same standard of living they cost more to operate after they are built. They represent therefore a greater investment of capital than British ships of the same tonnage and unless something is done to equalize the difference they cannot earn dividends upon this augmented capital. As long as the condition has been produced by an American policy it should be remedied by the American nation. The American merchant marine has not been justly treated.

Both political parties, as noted, are in favor of restoring the merchant marine to the high seas and the expression of opinion at the polls next November cannot be otherwise than an endorsement of this policy.

When the American Merchant Marine Commission, therefore, presents its report at the opening of congress in December it is expected to meet with a friendly audience, and it is hoped that the measure which will be reported by the commission will embody a practical remedy.

FREIGHT CONDITIONS ARE IMPROVING.

Conditions in lake trade are decidedly improved and business in general is likely to be brisk until the close of the season. The wild ore rate has been restored to the contract basis which is 70 cents from the head of the lakes, 60 cents from Marquette and 55 cents from Escanaba, while carrying charges in grain are in certain instances even better than this. It may be necessary also to revise the estimate as to aggregate ore shipments for the entire year which a few weeks ago were not expected to exceed 17,500,000 tons. The revision is due to the fact that the Steel Corporation has decided to have its reserve ore piles equal to those of last year which were approximately 3,500,000 tons on dock Dec. 1 last year. The practical determination of the Steel Corporation to retire its barges will also have a beneficial effect upon the general condition of the trade. The experience of the Steel Corporation has been that in the bad weather of late fall it is more economical to operate the steamer without its barge, a steamer with a tow frequently requiring three weeks for the trip in foul weather. It will depend upon conditions which will develop within the next two or three weeks as to whether the wild rate will exceed the contract rate. It would not be surprising if it did so. While the down trade is very good indeed the up trade cannot be regarded as satisfactory. Coal is going forward only in limited quantities, not sufficient to care for the contract vessels.

The Bridgeport Steamboat Co., Bridgeport, Conn., are building a 700-ft. addition to its wharf which will make it the largest dock in Bridgeport.

CHICAGO GRAIN REPORT.

Chicago, Sept. 27.—The substantial conditions noted in previous report are still holding to the market and vessels continue in fairly active request on basis $1\frac{1}{4}$ cent corn for Buffalo, Georgian bay, etc., with all water routing about steady @ $3\frac{1}{2}$ -cent corn to Montreal. Receipts of the past week included some 830,000 bu. wheat, 2,660,000 bu. corn and 1,750,000 bu. oats: without shipments, as will be noted, closely to the season's best average. Liners appear to have good responses in package freight and dealing but in small parcels of grain.

There is warrant for more general distributing of vessels and this with the regularity of grain movement from country points and steady going export demand is stimulating noticeably an improvement in local rates.

Of the shipments summarized below distribution is about as follows: Via all rail lines of wheat 180,000 bu., of corn 165,000 bu. and oats, 310,000 bu.: via lake to Buffalo, of wheat, 245,000 bu.; corn, 2,300,000 bu., and oats, 400,000 bu., and via lake routing for Canada points, 773,000 bu. corn and 61,000 bu. oats.

Lake and Rail Shipments:

	This week.	Last week.	Same week last year.
Wheat	440,929	561,652	555,885
Corn	3,313,734	2,993,701	2,800,350
Oats	776,266	1,365,499	1,108,141
Total	4,530,929	4,920,852	4,464,376

	Shipments since Jan. 1, 1904.	Same time last year.
Wheat	10,930,811	14,876,869
Corn	55,435,279	64,166,322
Oats	33,779,892	49,014,579
Total	100,145,982	128,057,770

Stocks of Grain in Elevators:

	This week.	Last week.	Same week last year.
Wheat	4,739,000	4,414,000	7,116,000
Corn	5,552,000	5,428,000	6,948,000
Oats	10,177,000	9,886,000	3,119,000
Rye	546,000	703,000	483,000
Total	21,014,000	20,431,000	17,666,000

METAMORPHOSIS OF A VESSEL.

The coal-hulk Ruth is to be fitted with engines and self-dumping hoists for the work of transferring coal to vessels in San Francisco bay. She was originally the bark Sharpshooter, and in September, 1895, was caught in a violent storm off the coast of Mexico. Capt. Watt, the master, had his wife and three children with him, and, after the masts had gone overboard, he threw a bottle into the sea containing an account of the disaster and stating the location of the wreck. The bottle went ashore, the message was read and a Mexican warship sent out to their relief. The Sharpshooter was towed into Guaymas and later was brought to the port of San Francisco by the Spreckel's tug Fearless. She was repaired and went to sea again as the barkentine Madeline, but was never successful. At last she came to anchor in the quiet waters of Oakland harbor and changed her name to Ruth. The Western Fuel Co. took the masts out of her and made her a coal-hulk.

It is announced that the battleship Nebraska will be launched from the yard of Moran Bros. Co., Seattle, Wash., on Oct. 7.

One of the big sea-going tugs authorized by the last congress is to be constructed at the Portsmouth navy yard.

NEW BATTLESHIPS AND ARMORED CRUISERS.

Bids will shortly be opened by the navy department for the construction of the battleship New Hampshire and the armored cruisers Montana and North Carolina. It is intended to make the New Hampshire the greatest battleship in the navy. The hull of the battleship is to be protected at the water line by a complete belt of armor 9 ft. 3 in. wide, having a uniform thickness of 9 in. amidships, gradually decreasing to 4 in. at the stem and stern. There will be a complete protective deck extending from stem to stern, the deck being flat amidships but sloping at the middle through-out and sloping at each end. The main battery will consist of four 12-in. breech-loading rifles, eight 8-in. breech-loading rifles, twelve 7-in. breech-loading rifles and four submerged torpedo tubes. Her secondary battery will consist of twenty 3-in. 14-pounder rapid-firing guns, twelve 3-pounder semi-automatic guns, two 3-in. field pieces, two machine guns having a caliber of .30 and two automatic guns also having a caliber of .30.

The following description of the machinery of the armored cruisers North Carolina and Montana and the battleship New Hampshire were furnished to the Review by Rear Admiral Charles W. Rae, chief of the bureau of steam engineering:

The propelling engines of the armored cruisers will be right and left, placed in watertight compartments and separated by a middle line bulkhead. The engines will be of the vertical, inverted-cylinder, direct-acting, triple-expansion type, each with a high-pressure cylinder 38½ in., an intermediate-pressure cylinder 63½ in., and two low-pressure cylinders 74 in. in diameter, the stroke of all pistons being 48 in. The indicated horse power of propelling engines will be 23,000 when making about 120 revolutions per minute, and with a steam pressure of 250 lbs. at the high-pressure cylinder.

The order of the cylinders, beginning forward, will be forward low-pressure, high-pressure, intermediate-pressure, and after low-pressure. The forward low-pressure and high-pressure cranks will be opposite, also the intermediate and after low-pressure cranks, the second pair being at right angles with the first. The sequence of cranks will then be: High-pressure, intermediate-pressure, forward low-pressure, and after low-pressure. It is understood that any other arrangement of cylinders, sequence of cranks, balancing of reciprocating parts, or any method of reducing vibration will be taken into consideration by the bureau of steam engineering and be given proper weight, as will also any arrangement or device in the main or auxiliary machinery tending to the economy of steam.

The main valves will be worked by Stephenson link motions with double bar links. There will be one piston valve to the high-pressure cylinder and two each for the intermediate and low-pressure cylinders. The framing of the engines will consist of forged-steel columns trussed by forged-steel stays. The engine bed-plates will be of cast steel, supported on keelson plates. All cranks, line, and propeller shafting will be hollow. The shafts, piston rods, connecting rods, and working parts generally will be of forged steel.

Each main condenser (two in number) will have a cooling surface of about 14,400 sq. ft., measured on the outside of the tubes, with water passing through the tubes. The main circulating pumps will be of the centrifugal type, one for each condenser. The air pumps will be independent of the vertical, double-acting type.

There will be sixteen boilers of the water-tube type, placed in eight watertight compartments. The total grate surface will be about 1,590 sq. ft., and the heating surface at least 68,000 sq. ft. The forced draft system will consist of blowers discharging into air-tight fire rooms, there being two blowers in each boiler compartment. There will be four smoke pipes.

The propelling engines of the battleship New Hampshire will be right and left, placed in watertight compartments and

separated by a middle line bulkhead. The engines will be of the vertical, inverted-cylinder, direct-acting, triple-expansion type, each with a high-pressure cylinder 32½ in., an intermediate-pressure cylinder 53 in., and two low-pressure cylinders 61 in. in diameter, the stroke of all pistons being 48 in. The indicated horse power of propelling engines will be 16,500 when making about 120 revolutions per minute, and with a steam pressure of 250 pounds at the high-pressure cylinder. The order of cylinders, sequence of cranks, number of main valves, framing, etc., is to be similar in design to the engines of the North Carolina and Montana. There will be two condensers each with a cooling surface of about 10,375 sq. ft., measured on the outside of the tubes the water passing through the tubes. The circulating and air pumps are independent, of suitable size, and similar in design to those for the North Carolina.

There will be twelve water-tube boilers, placed in six watertight compartments, with three smoke pipes. The total grate surface is to be 1,100 sq. ft., and the heating surface at least 46,750 sq. ft. Provision is to be made for forced draft by blowers discharging into air-tight fire rooms, there being two blowers in each boiler compartment.

EXPLOSION ON AN OIL-BURNING STEAMER.

Notwithstanding the use of oil as a fuel is becoming very generally adopted on many Pacific coast and Oriental steamers, both large and small, yet but one very destructive disaster is to be recorded. Reference is made to the fearful explosion of the large oil tank on board the steamship Progress. This shocking disaster occurred at the Fulton Iron Works at San Francisco, Cal., more than a year ago. At the time of the explosion, the Progress was undergoing some temporary repairs preparatory to making a long voyage. This explosion caused the death of several, the wounding of a number, and the almost entire destruction of the vessel. Just how and why the dreadful accident occurred will always remain more or less problematical.

Since the loss of the Progress, unusual caution has been observed by the public officials and the officers in command of all oil-fuel steamers on the coast to prevent a repetition of such a marine horror. However, the second disaster to record has just occurred at the port of Portland, Ore. This explosion took place on board the coasting steamer Geo. W. Loomis, and as a result W. N. Phelan, the second engineer, was fatally burned, and most of the woodwork of the vessel totally destroyed. The Loomis is an oil-burner, and the feed pipe leading from the tanks suddenly sprang a leak near the fire box, causing an explosion. The fact that the vessel is constructed of steel prevented her complete destruction by flames. The steamer, which is comparatively new, was built at the Union Iron Works of San Francisco. She is about 200 ft. long, 28 ft. beam, and 17 ft. hold; has 691 gross and 402 net tonnage.

The tank is amidships and is divided into six compartments by a fore and aft bulkhead and two transverse bulkheads. At the ends of the tanks are cofferdams 4 ft. wide running from top to bottom to prevent gas from escaping and reaching the rest of the vessel. The tanks will hold 6,000 barrels of oil, and can be filled or emptied in eight hours.

The Loomis has triple-expansion engines which are capable of developing 400 H. P. and an average speed of nine knots per hour. She also has the Howden system of forced draft.

Almost the entire upper works of the vessel were destroyed. The causes of the accident are to be rigidly investigated by a marine court of inquiry, and the responsibility fixed. This disaster will cause greater vigilance than ever to be enforced on all oil-burners. The Loomis has long plied coastwise between San Francisco and northern ports. She will be repaired at once.

HYDRAULIC DREDGE BURTON.

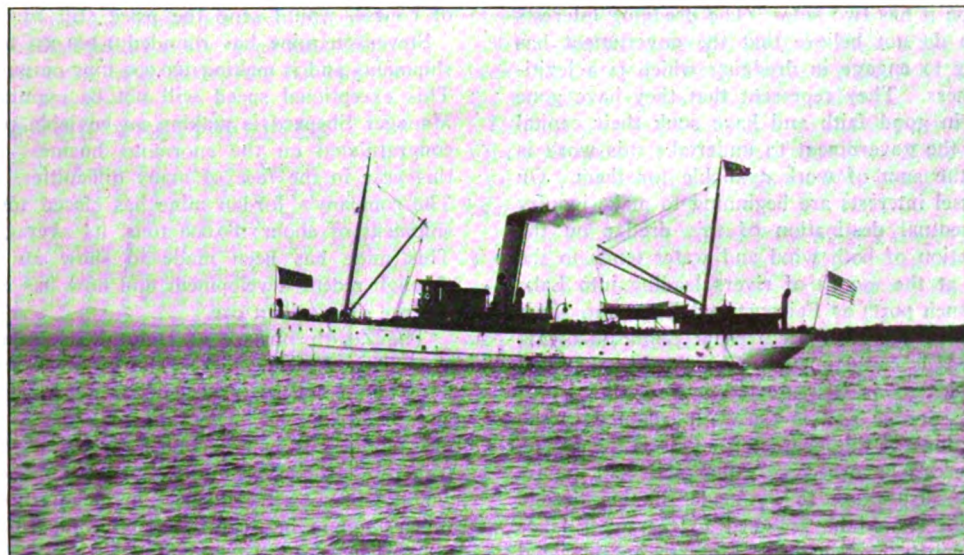
There is evidently some mystery surrounding the movement of the government dredge Burton. This dredge was originally designed for service on the great lakes and was built out of money appropriated for the improvement of Lake Erie harbors. While there was no specific appropriation for the dredge the war department was permitted to apportion money appropriated for improvements at all the harbors in Lake Erie to pay for its construction.

The dredge, which was designed by Capt. J. C. Sanford, government expert on dredges, was built at the plant of the

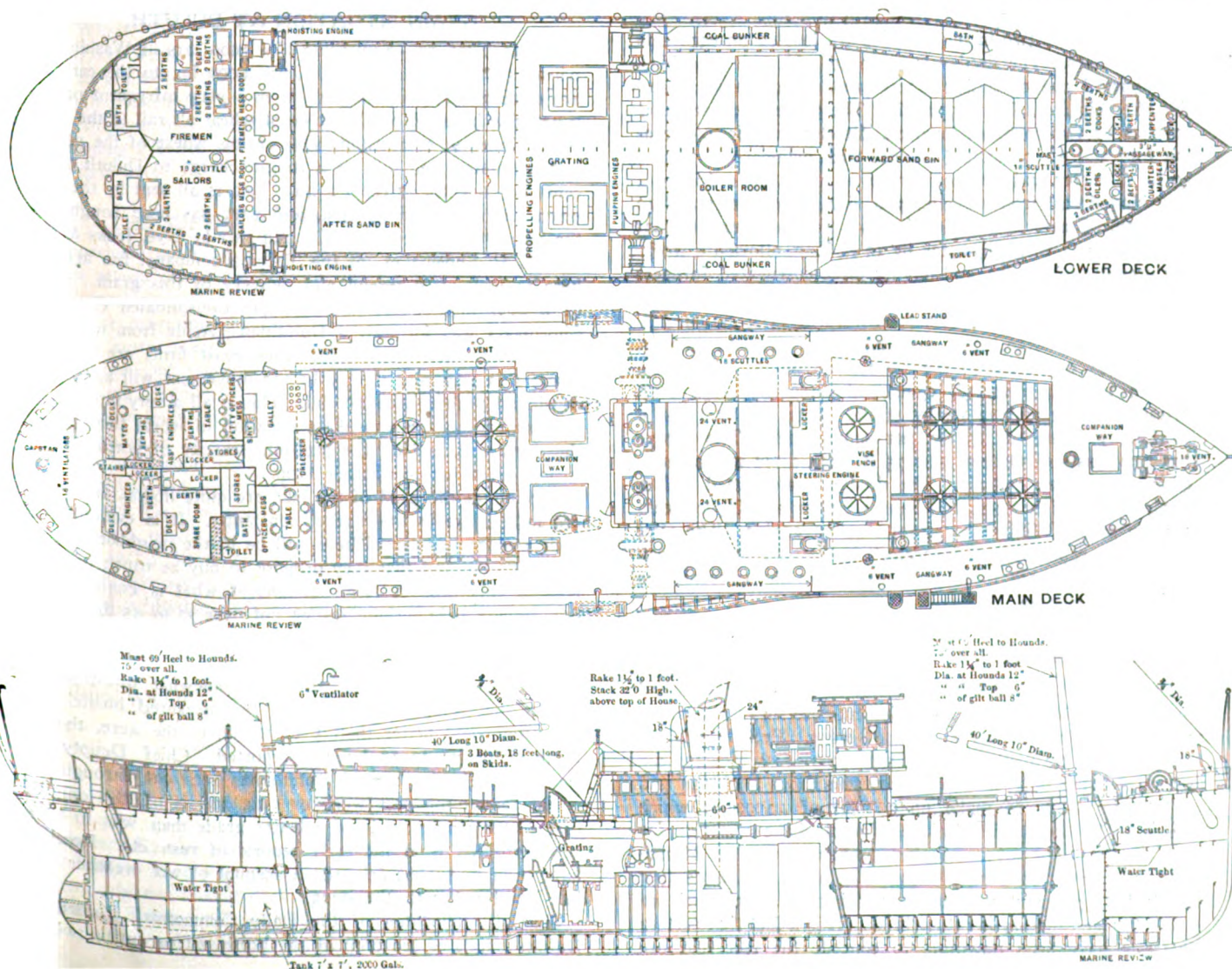
Maryland Steel Co., Sparrow's Point, Md., and was finished some weeks ago. It was expected, of course, that it would come direct to the great lakes by way of the St. Lawrence

river but for reasons which are not yet clearly known the dredge was halted at Philadelphia. The monthly bulletins issued by the war department to its corps of engineers now states briefly that the dredge is to be assigned to work upon deepening the Delaware river. This is all that is specifically known about it up to

the present moment, though Maj. Dan C. Kingman, the government engineer in charge of the Cleveland district, at



SUCTION DREDGE BURTON.



whose suggestion the dredge was built, suspects that the private dredging interests of the great lakes are responsible for the new assignment of the dredge. More, however, is likely to be known about this subject in a little while. Like every other question it has two sides. The dredging interests of the great lakes do not believe that the government has any right whatever to engage in dredging which is a legitimate private business. They represent that they have gone into the business in good faith and have sunk their capital in it and that for the government to undertake this work is merely to lessen the sum of work available for them. On the other hand vessel interests are beginning to make inquiry concerning the eventual destination of this dredge on the ground that the action of both wind and water tends to the formation of bars at the mouth of rivers leading into Lake Erie especially at such ports as Fairport and Conneaut. Last fall a delay of serious character occurred at Conneaut owing to the fact that vessels could not get over the bar that had been suddenly made. This new government dredge is, of course, a hydraulic dredge and is especially adapted to the removal of obstructions of this character. This is the reason why the vessel interests have become rather active in inquiring concerning the disposition to be made of this dredge which they maintain should be assigned to the great lakes so long as it was constructed out of the money appropriated for the improvement of great lakes harbors.

This new dredge is 177 ft. over all, 166 ft. between perpendiculars, 38 ft. moulded beam and 19 ft. moulded depth. The hull is subdivided by watertight collision bulkheads, extending to the lower deck only on frames 9 and 73 and a bulkhead on frame 41 with a door in it to permit access. The coal bunkers are two in number and are located on each side of the boilers. The dredge is equipped with two sand bins, the forward one extending from frame 13 to frame 29 and the after bin from frame 52 to 68. The propelling machinery consists of two vertical, inverted, direct-acting, jet-condensing fore and aft compound engines with cylinders of 15 and 30 in. diameter and common stroke of 24 in., each driving a four-bladed cast iron propeller 7 ft. 6 in. in diameter and 12 ft. pitch. Steam is supplied by two Scotch return tubular type boilers 13 ft. in diameter by 12 ft. long, allowed a working pressure of 125 lbs. and having three corrugated furnaces each. The 15-in. centrifugal dredging pumps are capable of raising and discharging against a total head of 14 ft. 60 cu. yds. of water per minute. The pumping engines, two in number, are directly connected to the 15-in. sand pumps. They are of the vertical, inverted, compound-condensing type with cylinders of 12 and 22 in. by stroke of 14 in., built for a working pressure of 125 lbs. per square inch. The dredge has two masts of Oregon pine 75 ft. high fitted with all necessary iron work and rig. The dredge is also fitted with a Hyde combination steam and hand windlass and Hyde steam capstan and a Williamson steam steering engine. The pilot house, the captain's and inspector's rooms are fitted in oak and cherry and are thoroughly modern in the conveniences which they possess.

IRON ORE SHIPMENTS ARE HEAVY.

Duluth, Sept. 26.—All iron ore hauling railroads have had their ore schedules revised and shipments are sure to be larger than was anticipated earlier in the season. Probabilities for Minnesota mines now are about 13,500,000 gross tons for the season, leaving only about 6,500,000 tons from Michigan and Wisconsin points to make up a total of 20,000,000 which seems to be the outside estimate for all Lake Superior for this season. The overwhelming preponderance of Minnesota was never so clearly shown. In 1900 Minnesota first reached 50 per cent of total lake shipments. Sales of ore are better and inquiry is rather brisk. It is a fact that eastern interests have been unwilling to concede the fact that ore

prices have been better for a month, but they have, and they are even now higher than quotations given at Cleveland. It is certain that unsold Bessemer for this year's delivery are scarce and any increased sudden demand, which may not come of course, would send the price still further upward.

Stevenson mine has rounded 1,100,000 tons in its season's shipments and is making 100,000 tons output every seven days. This exceptional speed will not be maintained to the close. Manager Shepard is making an enviable record and is to be congratulated on the enormous business that he has done this year in the face of many difficulties, including a strike. The company's Jordan mine has closed for the year, after a shipment of about 180,000 tons, its average annual business. This mine has been made to show an increased tonnage through recent development and now has a very considerable reserve of excellent ore.

The Zenith furnace at Duluth has been receiving Mesabi ores from Hawkins, Elba, Forest and Scranton, the latter an experimental lot taken out last spring, and has been making an all-Mesabi pig. The furnace has a very steep bosh and has frozen. It is now out for repairs. Sales of Breitung-Hematite, from Negaunee, have been made to the company, and it will soon try this ore in its mixture. The furnace is understood to be operated at a profit, while the coke and by-product works are doing very well. Efforts are being made to increase the use of coke gas for heating purposes in competition with coals. The furnace company is selling crushed coke delivered all through Duluth for \$5.50 a ton and is working up quite a trade for its surplus.

GRAIN SITUATION AT DULUTH.

Duluth, Sept. 27.—Something like 2,000 cars of Washington wheat, probably averaging at least 1,000 bu. to the carload, are coming here for the east. It is a very infrequent occurrence, this bringing of Pacific coast wheat all rail to the head of the lakes in competition with spring wheat of the northwestern states, and it is at a freight charge to Duluth of 45 cents per 100 lbs, 27 cents a bu. This is all sent by the Tacoma Grain Co. of Tacoma, and part has been bought by the Van Dusen Harrington Co. and part by Nye, Jenks & Co. Mr. R. P. Shoemaker, of the Tacoma company, has arrived here to look after receipt and delivery of this grain. Most of it goes into the elevators of the Consolidated Co. Mr. Shoemaker was formerly a Duluthian. Aside from what the Tacoma company is sending, other coast firms are to ship wheat this way, and it may be the movement will aggregate considerably above 2,000,000 bu. This is all a very interesting commentary on the immediate situation in wheat throughout the northwest, and on the probable scarcity of northwestern spring grain before another crop.

Receipts at the head of the lake are quite liberal, and eastern millers are in the market constantly. It is evident that their requirements from here will be in the neighborhood of 20,000,000 bu. and that they propose to buy as much of it as possible this fall. A large amount of what is coming here now is very light weight, testing not over 37 to 45 lbs. to the measured bushel. As it is sold by weight this is having a serious effect on the yield. This light weight stuff is coming to be a problem, and its value is somewhat questionable. Wheat that tests 40 to 45 lbs. to the measured bushel will not often yield better than 5 to 10 bu. to the acre, though some yields up to 15 bu. are reported. Chief Deputy Inspector H. E. Emerson of Duluth has been out through the wheat region the past week or two, and is of the opinion that wheat coming in is of a better grade than was to have been expected from the early reports of rust, etc. Receipts have been somewhat delayed on account of wet weather that has interfered with threshing.

Chas. H. Thornton of the Daily Commercial Record of Duluth estimates the crop of the northwestern spring wheat

states at 136,000,000 bu. compared with 157,000,000 last year, making no account of macaroni.

Wheat freights from the head of the lakes have been better a few days, at 1¾ cents a bushel. Small charters are frequently made and a good deal of wheat has been placed for fall delivery. Flax is moving steadily at the same rate. Shipments of coarse grains are to be large during the fall months.

CAR FAMINE IN THE WHEAT BUSINESS

Duluth, Sept. 26.—There is actually a car famine in the wheat business and this in a short crop. None of the roads running west from this city are able to supply cars as they are needed for the movement this way of grain. One division of the Northern Pacific has received no wheat cars this fall except such as have gone in there with coal; and elsewhere on that road there is a very decided shortage. At one station on the "Soo" line here a Duluth elevator company last year moved only fifteen cars the same firm has already bought 18,000 bu. wheat and has not had a car with which to get its stuff forward. The Great Northern is reported to be in the same position, and there is much complaint from shippers all over the northwest. This is quite a surprising matter, considering the reports of short crop, and indicates to what an enormous extent the general merchandise trade has grown and how strongly it is holding up this fall.

Receipts of grain at the head of the lakes last week, surprising as it may seem, were far ahead of the equivalent week last year and this in spite of short crop and a later season. There were more than 3,000,000 bu. grain received at Duluth in the week and the various grains ran ahead of last year as follows: Wheat, 400,000 bu.; oats, 625,000; barley, 511,000 bu.; rye, 27,000; while flax ran behind about 100,000 bu. Shipments of all grains for the week were 544,000 bu. in addition to 141,000 bu. taken by head of the lake mills. Receivers, elevators, shippers and vesselmen are very busy these days and are reaping a better reward than they had hoped for up to a few days ago.

THE SUPERIOR IRON WORKS.

The Superior Iron Works, Duluth, Minn., reports a very prosperous season and have filled a number of orders for high-class machinery. They built for the government the machinery for operating the large mold traveler in use at the Superior entry where the concrete piers are being built. This order included especially designed four-screw, worm-gear hoisting engines, having a lifting capacity of 60 tons. They also built a number of engines and derricks for Messrs. Hugo & Tims of Duluth for use in building the concrete pier at Harbor Beach on Lake Michigan. An order for specially designed machinery was filled for the Duluth Dredge & Dock Co. for raising the hopper doors of dump scows by steam power. During the summer they shipped four sets of anchor hoist engines to the Dunbar & Sullivan Co. of Buffalo for use on their new steel drill scows. They also furnished a dredge deck engine to the same company. A number of orders were received for cable haulage engines for use in shifting cars on coal docks. Mr. Frank Hayes, the lessee of the company and a mechanical engineer of ability, is well satisfied with the business which the company has done so far.

AROUND THE GREAT LAKES.

Capt. H. J. Regan has been appointed master of the steamer *Corsica*.

The steamers Eastern States and Western States of the Detroit and Buffalo Line will operate until Dec. 15.

The Pennsylvania fueling dock at the harbor of Ashtabula caught fire on Sunday morning and was badly damaged.

A new chart in colors, No. 4, of the St. Lawrence river has

just been issued and is now on sale at the office of the Marine Review.

Capt. James Reid of the Reid Wrecking Co. announced that the firm will station the wrecking steamer *Manistique* at Mackinaw City this fall.

While the wreck of the Rutland liner *Walter L. Frost* has been abandoned on South Manitou island, the Reid Wrecking Co. expects to recover all the machinery.

Repairs have been completed on the steamer *Choctaw* at the Cleveland yard of the American Ship Building Co. This steamer went ashore on Manitou island and was badly damaged.

A pile containing 125,000 tons of soft coal was on fire this week at dock No. 1 of the C. Reiss Coal Co., Sheboygan. Men with huge scrapers are scattering the coal and soaking it with water.

The steamer *Alfred Mitchell*, laden with ore, grounded off the west pier at Huron last week owing to low water but was released when the wind shifted and brought the water back to its normal state.

The steamer ordered by W. H. Becker a few weeks ago will be named after Francis L. Robbins of the Pittsburg Coal Co. She will be built at the Cleveland yard of the American Ship Building Co.

An examination of the Union liner *Ramapo*, which has just been completed at Chicago, shows that the steamer was badly injured when she stranded upon the rocks at Milwaukee. Sixty plates will have to be either re-rolled or replaced.

The Boulton Boat & Powder Co., which was recently organized, has bought the old Monk ship yard at Sandusky. The work of improving the property will be begun at once. Several large buildings will be erected and about 100 people will be employed.

Work on the Wisconsin pier at the Superior entry is about over for the season as far as putting in concrete is concerned. About one-half of the pier has been built. This means that about 1,600 ft. of the pier has been constructed from the inner harbor line outward.

Considerable alarm was felt last week for the safety of the steamer *Louisiana* which was overdue four days and of which no account had been received after she left Escanaba. The *Louisiana* showed up all right however on the fifth day. She was in a leaking condition and the captain had sought shelter.

John Gretzinger, second engineer of the steamer *Western States* of the Detroit & Buffalo Line, resigned last week to take charge of a large power plant at Pittsburg. As a token of esteem with which he was held by the crew of the vessel they presented him with a fine gold-headed umbrella and a suit case.

For only the second time since it was built in 1891 the Ann Arbor car ferry No. 1 is undergoing repairs in dry dock at the Craig ship yard at Toledo. She will be in dry dock about five weeks. This car ferry operates on Lake Michigan and has had very strenuous work to do. She was built by the Craigs.

At the request of United States authorities, Wrecking Master H. W. Baker of Detroit has sent one of his crews to the wreck of the schooner *Gardner* to blow out the spars and such other parts of the boat as obstruct navigation. The *Gardner* burned and sank off Richmondville, Mich., Lake Huron, Sept. 15, and the hull is a dangerous obstruction to navigation.

The Reid Wrecking Co. is now at work dredging the site formerly occupied by the steamer *Minnesota* near the head of Russell island, St. Clair river. The Reids contracted to blow up the *Minnesota* which was coal laden when she burned and sank last fall, but when the job was finished the government engineer claimed that there were only about 18 ft. of water about the spot while the wreckers maintained that there were 21 ft. The dredging is expected to put an end to the controversy.

MR. HENRY W. PEABODY'S ADDRESS.

At the Boston session of the Merchant Marine Commission Mr. Henry W. Peabody, who has been all his life engaged in mercantile pursuits in Boston, appeared before the commission and pleaded for a direct subsidy in behalf of American shipping. He was opposed to discriminating duties and his address was very interesting indeed. It is given below as follows:

"The nature of my business has required me for the last forty years and more to charter vessels for the export of merchandise, and also for the import of merchandise, and I have deplored as much as anybody can the decay of our commerce, of which I have been constantly aware. I have always been desirous that our merchant marine should be re-created, but not until 1896 did I commence to take a legislative view of the subject. My attention was then called to the subject by the declaration in the Republican platform in favor of discriminating duties, which I believed to be a pernicious method of endeavoring to accomplish a re-creation of our merchant marine. It was not appropriate to agitate the subject at that time, or until after the election. I was deeply interested in the election of President McKinley, and I had arranged, if he was elected, to go to Australia, and I went. But before leaving I wrote a letter to President McKinley, stating to him my objection to the method proposed by the platform and urging that he should not recommend it in his message. I then stated to him my objections in a few words. I will read just one sentence which I have today copied from the letter: 'I venture to express my utter dissent and objection to the proposed plan to build up a dead industry, the building of ships for foreign trade, by choking the commerce which uses them.'

"I have progressed since that time, but this was my positive expression:

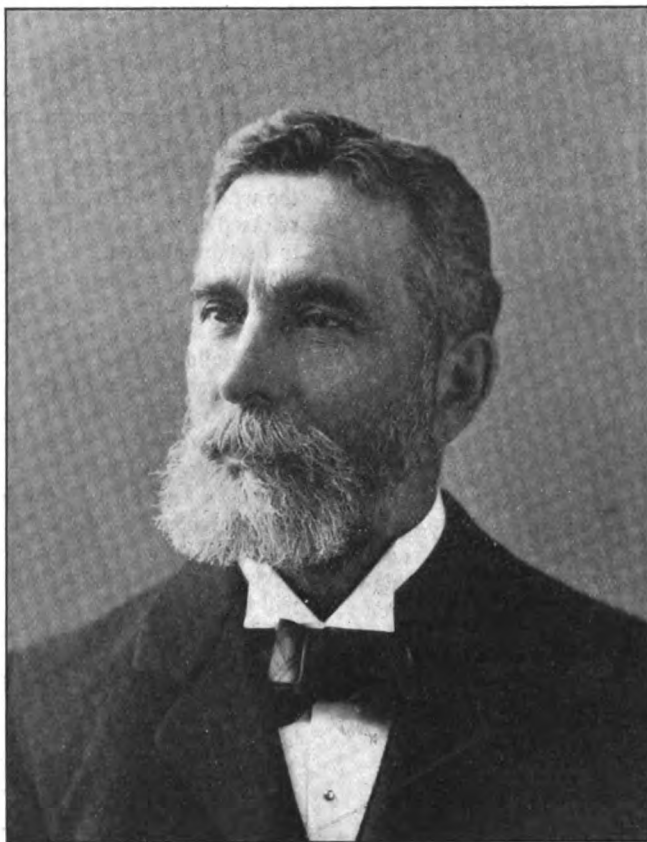
"I have for years believed that the American ownership for foreign trade might be coaxed into being by a different course, the opportunity to buy the best in the cheapest markets of the world for a term of years, to be limited to foreign business, and to be free of all tax as property. Not under private ownership but incorporate, for the customs of today do not require that a merchant shall own any vessels."

"The president did recommend discriminating duties, but it was a dead issue for the next two years. When congress opened in December, 1898, I was in London attending to business there, and then President McKinley recommended a new measure for the re-creation of the merchant marine—the application of a subsidy—and, to hasten results, the admission of vessels of foreign build, coupled with the obligation to duplicate the tonnage in this country. I was able to see the effect that that had upon the business community of England, and I appreciated that it was a very far reaching and wise recommendation. On Dec. 9 I cabled to the president

my approval of and belief that such a measure would re-create the merchant marine. I sent a cable to our senator, Mr. Lodge, and to the secretary of the treasury, urging the same action.

"From that time to this I have been a strong advocate of subsidies and strongly desirous of re-creating the merchant marine generally upon that principle, which I heartily accepted and believe in now. But I am aware that changes have come in the last few years, and that what might have been possible six years ago would not be so feasible today. I am quite ready to accept the application of the same stimulus upon different conditions, and since it is the desire of the ship builders to eliminate foreign vessels I have no desire to urge that they should be admitted. But I am so strongly in favor of the passage of a subsidy measure, because I think it is the only way to create something which we have not got. I believe that the subsidy elements of the Payne bill and the Hanna bill and the Frye bill were substantially upon good lines—the granting of a mileage subsidy to vessels according to their speed and according to the distances traveled, and also mail subsidies. I believe if a system of that sort could be established, the tonnage of the United States would materially increase.

"I need not say very much more in favor of subsidies when I say I fully approve of them, but I should say something in regard to my reasons for disapproving of the other principle which has been advocated by many here today—that is, discriminating duties. I do not believe it is a good plan to charge a penalty for what is not done, when we may pay a premium for what is done. Suppose we were to commence to discriminate by a differential, as some have said, of 10 per cent, or, as others have said, of 5 per cent, upon our imports. Five per cent would be a sufficient enormity. Upon \$800,000,000 of imports it would involve an expense of \$40,000,000, which is five times as much subsidy as was considered in the Frye bill. In 1901 we imported in American bottoms but \$93,000,000 out of \$776,000,000 of imports. The amount of imports exempt from discriminating duties would be only \$93,000,000, the differential thereon aggregating about \$4,500,000; and we can all see that if that was exempted, it would simply be a tax in another form, because the American ships would exact the larger part of the 5 per cent duty in their enhanced rates of freight. My thoughts naturally turn to hemp, of which I am a large importer. It is on the free list. Manila hemp at the present time is worth about \$180 a ton. Five per cent upon that value would be \$9 a ton, which would be just about the amount of the freight from the Philippines to this port, and a 100 per cent rise in the freight would be no more than the ship owner would exact if he had the absolute monopoly. It amounts, in other words, to the consumer of hemp, to nearly a half a cent a pound, which would be a great handicap in competing with other countries that manufacture cordage."



MR. HENRY W. PEABODY.

Senator Lodge. You are assuming that in order to make discriminating duties operate with anything like fairness the government must impose a duty on articles now on the free list?

Mr. Peabody. I have assumed that.

Senator Lodge. I think you are right about it. Where you could not make a reduction in favor of the article imported, you would have to impose a duty upon the article when brought by a foreign carrier.

Mr. Peabody. I suppose the same principle would apply by the reduction of duties on goods brought in American vessels.

Senator Lodge. On dutiable goods.

Mr. Peabody. On dutiable goods.

"It is not my province to discuss the legality of this measure, but I think I may say that I have heard through many years opinions expressed by our leading senators and by eminent counsel, such as ex-Senator Edmunds, that discriminating duties are in conflict with our treaties, and that there is no objection to the subsidy system, and when we see European countries paying subsidies to their ships with good results. I do not think we should hesitate about adopting a similar rule for our own navigation. It is a reasonable thing for the people of the United States, as a whole, to pay for our disability. We are not on equal terms with other countries in the matter of building or running ships. We know it. It is not the place of our commerce itself to be burdened with high rates of freight to obviate that disadvantage, but it is the proper thing for the government of the United States to institute a system of bounties which shall induce American citizens to build and run and compensate them for building and running American ships in competition with the world. I should deplore very much seeing our commerce put upon fictitious rates in order to pay the cost of running the ships."

Senator Mallory. You think if American ships were the only ones which brought European products it would be put up by American ship owners?

Mr. Peabody. I am sure they would be. They do not gainsay that themselves. They would be foolish if they did not take advantage of it.

Senator Mallory. Whereas, by a subsidy system, you would have the competition of the world?

Mr. Peabody. They would have to take freights at current rates, except coastwise, and it is likely, in the course of a couple of years, that the Philippines will be put on that basis.

Senator Mallory. Have you considered, with reference to this matter, the feature of allowing European vessels to bring the products of their own countries to the United States without any discrimination, confining the discrimination to the indirect trade?

Mr. Peabody. That was done in former years, but the custom of the world's commerce today is to disregard the flag of the vessel. I do not know of any nation that carries out that principle now.

Senator Lodge. Make no distinction between direct tonnage and indirect tonnage?

Mr. Peabody. No, sir. The less we run counter to general rules of commerce, the better for the American people. It may be a little more difficult to legislate in favor of a subsidy, but it is a good thing to try hard for, and I fully believe in it. I desire very much that it shall be accomplished, and if such a measure is put up, without any elements in it which render it necessary that I should not be in favor of it, I would most heartily support it.

Senator Mallory. I noticed that you indorse the principle of the Hanna-Payne bill. That provided for a subsidy based on tonnage and speed, both.

Mr. Peabody. Yes, sir.

Senator Mallory. That is, the subsidy under the first head was based on tonnage and speed both.

Mr. Peabody. Yes, sir. There were elements in the Hanna bill which I liked better than the Frye bill. It went back to the recommendations of the president. His recommendation was to apply the principles according to which the St. Louis and St. Paul were built in this country upon the admission of the Paris and New York. There were equal tonnage and equal quality after they were admitted. They were in just as good a position to realize a 100 per cent bounty as the American-built vessels were; but when the Frye bill was introduced, while it required the building of equal tonnage, it gave only 50 per cent of the aid to the foreign-built ship, and the Frye bill cut it down still further in other ways; but my principal objection to the Frye bill was that the privilege of registry, of foreign ships, with agreement to duplicate the tonnage in our yards, was not opened to the public, but was limited to a few companies in New York, who already owned about 318,000 tons of foreign steamers. There was another feature to which I particularly objected—that they were throwing down the bars to ownership. There was a clause in the bill which provided that whenever the word "citizen" was used in those bills it should be understood to mean a citizen of the United States, or corporations formed under the laws of the United States, or under the law of any state or territory, or of a foreign country. I considered that that was practically allowing our flag to be used as a cover for foreigners, even, to own vessels; and heretofore we have been as careful to guard ownership as we have the admission of vessels to American registry.

Another thing to which I objected was that the speed basis for realizing the subsidy was based upon a trial trip by the steamer. The subsidy was to run for a twenty years' term, and I advocated that the steamer should be paid for what she did, not what she could do on a trial trip when she was new; that if she slowed up afterwards, she should be paid as a slow ship should be paid. I think there was not sufficient attention given to the cargo ships, which under a simple mileage bounty would have the full benefit; and it is a most important class of vessels to provide for. I refer to vessels of moderate speed.

Senator Lodge. You prefer the French system of mail subsidy and mercantile subsidy to the English, which is almost exclusively that of mail subsidy.

Mr. Peabody. I do, senator; and the French are showing the power which is given to them by competing now very visibly in the foreign trade. They are even underbidding the English and other nationalities which have no subsidies; and if they had as many vessels as the English, or vessels enough, they would run the English out of the trade to some extent.

The Chairman. The commissioner of navigation says that by midsummer the American coast ship yards will be employed only to about one-third their capacity, and this will be exclusively on war vessels and coastwise vessels. Could you estimate how much these yards could put under construction, in addition to the war vessels and coastwise vessels, if they were given orders at once to do so?

Mr. Peabody. I remember at the time of the proposed subsidy legislation the same gentleman, the commissioner of navigation, Mr. Chamberlain, stated that he considered that the full capacity of the American ship yards to produce steamships of the character needed for the foreign trade was about 75,000 tons a year. Upon that principle it is easy to see that if at the present time we have vessels enough to carry 12 per cent of our imports, it would take us ten years at that rate to build another 800,000 tons, to do 25 per cent of our imports, and all that time, if we had 5 per cent discriminating duties, we would be paying \$40,000,000 to \$50,000,000 a year; and that is the point to which I wish to direct my remarks to-

day—in opposition to discriminating duties. I think most of the people who favor them have not looked at them in just the right way. It is a very expensive process.

The Chairman. Do you believe that the opening of American registry to foreign ships, without any form of national aid and encouragement to offset the higher cost of operation under the American flag, would amount to very much in building up the American merchant marine?

Mr. Peabody. I do not believe it would be of any advantage.

The Chairman. If foreign ship owners control the most of our general trade—and of course they have the vessels and the experience—would free ships alone, in your judgment, put the American on anything like a parity with them?

Mr. Peabody. No, sir; I do not believe it would be of any advantage without a subsidy.

EARLY NAVIGATION IN WESTERN PENNSYLVANIA.

Dr. J. S. Van Voorhis of Bellevernon, Pa., has written a very interesting article for the Bulletin of the American Iron & Steel Association upon the subject of "Early Navigation in Western Pennsylvania" of which the following is a transcript:

The primitive mode of transportation on the Monongahela and Youghiogheny rivers was by means of the flatboat. It was originally about 50 ft. in length and about 12 ft. in width. The gunnels, or sides, were each in one piece of timber of selected oak, in width 18 in. and in thickness 3 in., sawed with the whipsaw by man power. The bottoms were of the same material, laid crosswise, and nailed to the gunnels with large spikes made by hand in some nearby smithshop. The calking was done with tow, the coarse and broken part of flax. Oakum was not in use. These flats were constructed for carrying freight, which consisted chiefly of flour, whisky, salt, and hay. On the return trip the cargo was composed of salt and merchandise to a very limited extent; often the flats were not returned but were sold to parties below and generally at a very low figure. Farmers frequently joined in building a flatboat for their individual benefit.

The loaded flats were floated on the downward trip, but the return trip was made by the use of the iron-pointed pike-pole, which was from fifteen to twenty feet long, as might be required for use in shoal or deep water. A narrow passage or gangway was always reserved on each side of the freight for the convenience of the men who propelled the flat by means of these poles, one end of which would be in the bottom of the river and the other against the shoulder of the boatman. To make this kind of propelling power effective it was necessary for the men to have some skill in the use of the pole. One man generally stood at the stern with what was called a steering oar, whose duty it was to keep the flat in the proper channel. Some flats had oars on the sides or gunnels to aid the propelling power, especially to increase the speed on the downward trip. In low water at the different ripples or shoals it was necessary often to hitch horses to the bow by a rope, or cable, so called, in order to reach deeper water.

In the early part of the last century the general or state government, to facilitate transportation on the Monongahela and Youghiogheny rivers, established a system of wing-walls and chutes, which remain to this day, though hidden from view on the Monongahela by the slack-water improvement. They were constructed of stone in riprap shape. By the wings the water was turned into the chutes, thereby deepening the channel. We have no data from which we can definitely form an estimate of the tonnage these flats were capable of carrying, but it is in evidence that 60 barrels of whisky, or 100 barrels of flour, would constitute an ordinary load. It at any time it was discovered that the flatboat was too heavily laden the whisky was to a necessary extent rafted together and thrown overboard to float.

Flatboats were in use to carry freight as early as 1786. In that year the Pittsburgh Gazette was first issued and copies were distributed to its subscribers along the Monongahela by means of this boat as far up the Monongahela river as Castner's Ferry in the Horseshoe Bend. A photograph copy of that paper in that year I have in my possession.

Akin to the flatboat in very early days was the trade-boat. It was intended for floating. In its construction it resembled the flatboat as to the hull, but it had a covering in the shape of a modern cabin; its roof was the deck. Before starting on its long journey the boat was well filled with whisky, flour, cider, apples, and other articles in good demand in the lower Ohio and Mississippi valleys. The most desirable and profitable market to be reached was New Orleans. The small crew and proprietor returned home either by land through the wilderness or by ship by way of New Orleans and New York. After disposing of the cargo the boats were either sold for fuel or abandoned. Not a few fortunes were required in the early boat-trading business.

These boats and the flatboats were built at different points on the river, such as Brownsville, Williamsport, (now Monongahela,) and Elizabeth on the Monongahela, and Robbstown. (now West Newton,) Port Royal, and Smith's Ferry on the Youghiogheny, and often in earlier days near the mouths of creeks, so as to be convenient to the water saw mills located along their banks.

Coal boats, in common parlance flat-bottomed boats and broad horns, were first introduced into the trade about the year 1819, as nearly as we can ascertain. The first boat of this kind of which we have record was 12 ft. wide, 40 ft. long, and about 5 ft. deep. These craft were constructed exclusively for the transportation of coal to the lower river markets. They were substantially built for heavy loads. Their bottoms were entirely flat, and the floor was fastened with oak pins to the stringers, and the siding was in like manner tightened to the posts which were mortised into the gunnels. They varied in length from 40 to 80 ft. during the coal-boat floating trade. For many years this trade was very uncertain, as it depended altogether on high water for its existence. In those days there were no organized coal companies, but the trade was carried on by individuals of small capital. The boats were loaded during the low water season. At the rise of the water an impromptu crew of ten to fifteen men was collected and the boats were cut from their moorings in pairs and set afloat. They were kept in the channel by means of what were called sweeps, used as oars. By accident many of these boats were lost on the way.

At this date the coal trade in the Monongahela and Youghiogheny valleys is controlled by incorporated companies which have taken the place of the smaller operators. The coal-boats now vary in size from 120 to 180 ft. long and are capable of transporting 24,000 bu. in one boat, or over 900 tons of coal. One steamboat will tow to the lower markets forty such boats loaded, or 900,000 bu., and return with a greater number of empties.

Prior to the slackwater improvement in the Monongahela the keelboat held a prominent position as a freight carrier. It did not carry coal as freight. It was craft with model bow and stern and was propelled down and up the river by pike-poles as in the case of flatboats, but they were furnished with a foot-board outside the cabin, on which the man power operated.

At a very early date coal mines were opened near, or rather below, Greenfield, now Coal Centre, in Washington county. Mines were opened by Lyons & McFarland at an early date just below where Lock No. 4 is located. Years before the dams were built the Behanna boys shipped coal by flatboats and small coal boats from mines two miles above Monongahela City. A firm composed of the French Brothers operated mines at Limetown and Leechburgh, the former now known as Coal Bluff and the latter near Bunola railroad sta-

tion. They operated before any of the dams were built. These mines were three miles below Monongahela City. Of course there were plenty of mines near Pittsburg which were operated in early days. The slack-water on the Monongahela built the coal trade.

The information given above was chiefly received from my father, and he obtained it from his father, who settled near Monongahela City, or near where Monongahela now is, in 1780. My father often told me of emigrants going by boats to the new country of Ohio and Kentucky, the boats being built by themselves. In that day the gunnels of boats were hewed. In 1812 my uncle, John Van Voorhis, moved his household goods by his own boat to Ohio, by way of the Ohio and Muskingum rivers to Zanesville. I call to mind myself that in 1834 the Frye family from Washington county moved by their own keelboat to the west, some stopping at Cincinnati and others going on to Peoria, Illinois. The old boats were small and roughly built, but generally did the work expected of them.

Castner's Ferry was located in the toe of the Horseshoe Bend, where now is the flourishing town of Donora, about six years old and containing over 6,000 inhabitants, with very extensive steel and other works. Castner came to this country in 1775 and his descendants owned the farm where the ferry was located until the town of Donora absorbed it. This town is about four miles above Monongahela. Just above on the opposite side of the river is the new town of Monessen, about six years old. It contains one of the largest tinplate factories in the United States. Just above lock No. 4 is located the "Magic City" of Charleroi, laid out in lots in March, 1900, and now containing 7,000 inhabitants and a very extensive plate glass factory, other glass factories, shovel works, etc. Charleroi is named from a town of that name in Belgium. Monessen is a derivative of Monongahela and Essen, the latter a manufacturing town in Germany. Donora is named after its founder, W. H. Donner.

YACHT SALES.

The hunting launch Shack, owned by Mr. Jacob I. Bergen of New York has been sold through the agency of Stanley M. Seaman, New York, to Mr. Gain Robinson, Springfield, Mass. She is to be used for hunting and fishing trips on the Connecticut river. The same office has also sold the racing cat boat Trilobite for Mr. James D. Sparkman, New York Yacht Club, to Mr. Z. Mayhew, Jr., of Brooklyn, N. Y. The 40-ft. cruising yawl Genevieve has been sold by Mr. Conrad Stein to Dr. Alfred R. Starr, Riverside, Conn. Mr. Phillip L. Howard, New Rochelle, Y. C., has sold his knockabout Caper of the New Rochelle one design class, to Mr. Daniel K. Hanna, Cleveland, O. The boat has been shipped to Tupper Lake.

OPPOSED TO DIRECT SUBSIDIES.

Editor Marine Review: The Latins had a saying, that he who proves too much proves nothing. Of this I am reminded whenever I see undue stress laid on subsidy as the foreign source of all our shipping ills. I have lately read in a political work that

"The great causes of growth of foreign shipping and decline of American shipping for the foreign trade are well known."

By itself this sentence looks well. The reader comes to attention at once. But he reads on to learn that

"Great Britain began the payment of large sums to her ship owners in the forties, some in the guise of payments for carrying mails and some as direct subsidies."

This is far enough to read—for misinformation. The only truth in this sentence is this: The Cunard company was awarded a mail subsidy contract in 1839, and got a line on from Liverpool to Boston in the early forties. "Payment of

large sums" to British owners, "as direct subsidies" have never been made. To state that such has been the case, and that it is "well known" as a "great cause of growth" of British shipping, is to walk off with a pie-shop for ignorance and presumption.

In the same political work we find some figures quoted from proper authorities. With these let us make a few calculations.

British tonnage, 1903, steam in tons.....	13,410,894
British tonnage, 1903, sail in tons.....	1,478,677

Total	14,889,571
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In domestic trade, deduct.....	889,571
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British total in foreign trade.....	14,000,000
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British total of subsidies, 1903.....	\$5,536,612
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Spreading this sum over the fleet, we have to each ton	0.39.5
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American tonnage, 1903, in foreign trade, total of steam and sail	888,776
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American total of subsidy, 1903.....	\$1,611,794
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Spreading this sum over the fleet, we have to each ton	1.81
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So that, last year, our fleet in foreign trade, each ton of it, was subsidized $4\frac{1}{2}$ to 1, compared with the British against which we compete. This comparison is fairly made, according to the premises of the subsidy advocates, and should show them the folly of their theory, especially, when we consider the fact, that subsidy protects only the line that receives it, whereas their contention is that a mail subsidy will protect the entire marine to some extent. Why people who take interest enough in the subject of shipping, to speculate as to the action and utility of a subsidy policy for the recovery of our lost carrying trade, do not perceive at least some of its incongruities surprises me. Only a mistaken notion that the present maritime—reciprocity, free-trade policy is a good one to continue leads some intelligent citizens to tolerate the idea of subsidizing the entire marine. But this policy has been our ruination. It is inconsistent with our tariff relations with the world, and holds advantage for our rivals, but many disadvantages for ourselves, if we intend to be a shipping nation. To retain this policy and try to modify or nullify its inexpediency by superadding subsidy is to commit error in defiance of experience. We must rise to the occasion now before us, and abolish our slavery to a foreign doctrine, or there is no prospect of ever attaining our shipping rights.

The Marine Review rightly says of the Marine Commission: "It embodies the *last hope* of the shipping interests of the United States." If it reports a subsidy policy to be grafted on to the present foreign one, instead of abolishing it and resorting to the father's policy of constitutional protection, Good bye, American marine and American nation—you are both done for.

WILLIAM W. BATES

The Ollinger & Bruce Dry Dock Co., Mobile, Ala., announces that their new floating dock is ready for business and is capable of docking vessels up to 3,000 tons displacement. The company has also added to its equipment a 25-ton derrick crane for rapid handling of machinery, boilers and other heavy material.

The New York Ship Building Co., Camden, N. J., launched the fourth of the five lightships which it is building for government service last week. These lightships are 113 ft. long, 28 ft. 6 in. beam and 22 ft. 1 in. deep.

SCOTCH SHIPPING LETTER.

Glasgow, Sept. 16.—The warning note of coming labor troubles in the ship building industry is again sounded. The northeast coast section of the Amalgamated Society of Engineers (A. S. E.) have declined to accept the notice of a reduction of 2s per week and 5 per cent on piece rates given by the North East Coast Employers' Association, and have demanded its withdrawal. The recent claim of the men for an advance has not been withdrawn, and is still the subject of discussion with the employers, who, however, are by no means likely to give way. The membership of the Amalgamated Society of Engineers is now 96,008, as compared with 95,938 last month. On donation benefit there are 5,235 members as compared with 5,210; on sick benefit 2,049 as compared with 2,006; and on superannuation 4,738 as compared with 4,735. A sixpenny levy for a legal defense fund has been carried by a large majority. The monthly report for Scotland says that things there are very unsteady. Freights are still very low and a large amount of tonnage is being laid up, yet in face of this a number of orders for new ships were placed with Scottish builders during August. The building of turbine steamers would not, it adds, help the engineer who was out of work, but would rather tend to put a number more on the streets. It was supposed, however, to be in the van of progress, and they would require to march along with it.

An interesting event in ship building is the publication of the annual report of Palmer's Ship Building & Iron Co. The report, for the year ended June 30, 1904, states that the profit for this period, after providing for the cost of repairs and upkeep of plant and after making allowance for contingencies, amounts to £63,208 18s 7d, to which must be added the amount brought forward from last year, £5,654 10s 7d, making a total of £68,862 18s 2d available for distribution. This the directors propose to appropriate as follows: debenture and loan interest £9,345 8s 2d, dividend at the rate of 5 per cent per annum on both preference and ordinary shares (of which 2½ per cent has been paid) £30,164 12s 6d; to write off on account of extensions as depreciation £25,946 10s 4d; balance to carry forward £3,406 7s 2d. The depression in the ship building trade of the country has been accentuated during the past year and there has been a continued fall in the prices of the company's various productions. But, notwithstanding this, and the restriction of trade caused by the uncertainty of the political situation at home and the war abroad, the directors report that a profit has during the last half-year been made in every department. The output of mercantile tonnage, however, has been comparatively small as it has been difficult to secure orders at remunerative prices. The iron and steel departments have also been affected by the prevailing depression, and by a further fall in selling prices. The output of pig iron and steel has been well maintained, and recent capital expenditure on the blast-furnaces has resulted in a marked diminution in the cost of production. It is anticipated that the extensive alterations now in progress at the steel works will lead to a further reduction in costs.

At the annual meeting of the council of the Federated Associations of Shipmasters and Officers, under which title is comprised the Scottish Shipmasters' Association, Glasgow, the Mercantile Marine Service Association, the British Shipmasters' and Officers' Protection Society, Sunderland, representing the interests of over 9,000 British ship masters and officers, a large number of subjects in which the members of the federated associations are interested were brought up for consideration and discussion. Among these were the aliens bill, deck load-line bill, compensation to seamen, voting by proxy at parliamentary elections in the case of masters and officers, etc. The necessity for an amendment to section 186 of the merchant shipping act, in the direction of bringing shipmasters within the scope of that section so that they would be entitled to the same privileges as the other members of the

crew, was recognized and the secretary was instructed to communicate with the Board of Trade with a view to getting the act amended. The council were of opinion that the present rate of wages paid to shipmasters and officers was inadequate, but taking into consideration the present unremunerative rate of freights, the unsatisfactory state of trade, and consequent amount of disengaged tonnage, they were of opinion that the moment was not opportune to urge this matter on ship owners, and that it would be wise policy to defer approaching them till there was a reasonable expectation of the request being acceded to. The matter was left in the secretary's hands, to approach the owners when the state of trade warranted an increase in the wages paid to the deck officers. Another matter which engaged the attention of the council was the scarcity of junior officers. There are more applications in Liverpool for junior officers than can be met, and the Scottish Shipmasters' Association find the same difficulty existing in Glasgow. It was predicted that the junior officer question would force itself acutely on the attention of ship owners, and the state of things was ascribed principally to the inadequate rate of wages paid to deck officers. The same difficulty, it was stated by the chairman of the meeting, obtained on the east coast. Medical certificates were also dealt with, and it was suggested that facilities be afforded masters and officers for obtaining some knowledge of medical science and surgery. Capt. Black stated that in Glasgow these officers were absolutely without any means of obtaining the slightest knowledge of the healing art, and suggested that classes should be established to which masters and officers could apply themselves to obtain some knowledge of medicine and surgery. Possibly the best way would be to establish technical schools for masters and officers, wherein these subjects could be taught.

Barclay, Curle & Co., Ltd., have launched the steel screw steamer, *Justin*, built for The Booth Steamship Co., Ltd., for their Liverpool, New York and Brazilian trade. Her dimensions are: Length 365 ft., breadth 48 ft. 9 in., depth 26 ft. 6 in. to upper deck, and she is constructed to Lloyd's and Board of Trade highest class. Her gross tonnage is 3,500 tons, with a total carrying capacity in holds and bunkers of about 11,200 tons measurement. The vessel is rigged as a two-masted fore and aft schooner, and has a complete shelter deck. Accommodation is provided for about twenty first-class passengers. The facilities for loading and discharging are very complete, five cargo hatches of ample size being fitted, with twelve derricks and nine powerful steam winches of the builders' own make. An extra heavy derrick is also provided, capable of lifting 30 tons. Machinery, consisting of triple-expansion engines, has been constructed by the builders. The *Justin* is a sister vessel of the *Boniface* launched about six weeks ago.

The Standard Oil Co. of America do not admire the Shell Transport and Trading Co. of Great Britain, who are their great competitors as ocean oil-distributors. The annual report of the Shell Transport & Trading Co. states that the directors had hoped to place before the shareholders the adjustment of the accounts as compared with the estimated figures for the year 1902, but in view of the auditors requiring to have before them the accounts for the year ended Dec 31, 1903, before they certify final figures, it is not yet possible to do so. They are, however, able to state that apparently the adjustment entails the alteration of the profits for the year from £219,567 to £208,270. Shareholders will be asked to pass a resolution adjourning the meeting in order that the profit and loss account and balance-sheet may be made up as soon as the accounts are received from the Asiatic Petroleum Co. for the first and second halves of the year 1903, the accounts of the company depending on them. Important developments have taken place in the position of the company, in so far as their participation in the European business is concerned. The cost

of shares in the Petroleum Products Actien-Gesellschaft, shown in the last balance-sheet as £98,500, has been increased to about £161,250, representing one-third of the present paid-up capital of the company, which has been raised to 9,000,000 marks. A contract has also been entered into by which ocean transport is secured. The position and prospects of the Nederlandsch-Indische Industrie en Handel Maatschappij have materially improved. The production of crude oil from the Borneo fields during 1903 was 153,486 tons, as compared with 122,600 tons during 1902. The production for 1904, to August 27, has been 186,359 tons, made up of approximately 53,000 tons during the first three months and about 133,000 tons during the following five months.

DEMOCRATIC TEXT BOOK ON MERCHANT MARINE.

The Democratic national committee has issued a text book on the issues of the presidential campaign of which a leading feature is made of the certain movement for the rehabilitation of the American merchant marine. The chapter devoted to the American merchant marine in the foreign trade is as follows:

The Democratic party has ever been the true friend of American shipping. Under the wise leadership of James Madison, aided by the far-seeing statesmanship of Thomas Jefferson, in the early days of the republic our shipping became our most prosperous industry and the mainstay of the nation. From less than 25 per cent of our foreign commerce carried in American vessels, the policy placed on our statutes by the founders of the Democratic party increased the proportion to above 90 per cent. During all the years preceding the civil war an average of 75 per cent of our entire foreign commerce was carried in American vessels. During the past forty-three years less than 20 per cent of our imports and exports have been carried in American vessels.

During the last year of the Buchanan administration the American merchant marine reached the high tide of its prosperity, 2,642,628 tons of shipping being under American registry in the foreign trade, while last year American shipping under registry had fallen to 888,776 tons, *a shipping less by nearly 100,000 tons than we had in the foreign trade in 1810, almost a century ago.*

It cannot be said that the decline of our shipping under registry is due to lack of commerce to carry. Our foreign trade is now more than four times more valuable than it was in 1861, when our shipping engaged in its carriage was three times greater than now. Our ships then carried 65 per cent of our foreign trade, while they now carry 8 per cent.

The disappearance of our shipping from the foreign trade is largely due to the outrageous and unnecessarily high tariff inaugurated by the Republican party and maintained in defiance of public condemnation. To this high tariff policy and the high cost of materials used in ship building resulting therefrom is chiefly due the fearful decline in American shipping during the past forty-three years.

During the long period preceding the adoption of our high tariff policy, American shipping in the foreign trade was able—practically unaided—to compete successfully and profitably with foreign shipping. In no decade of our history is the record more illumined with the wonderful growth, superior qualities and high achievements of American shipping, than during that between 1850 and 1860. American ships were as heavily built and they were better built than their foreign rivals; they made an average of three voyages while their foreign competitors were making two; they carried their cargo with less damage; insurance of our ships and their cargoes was less, even in the ports of Great Britain, where they commanded a preference over British ships; their commanders, officers and seamen were men of superior intelligence, of marked intrepidity and wonderful skill, and the life

of our ships compared favorably with those of other nations, and the care exercised in keeping them in almost perfect condition was the marvel as well as the envy of all seafaring people. The presence of an American ship in a foreign port in the heyday of its greatness—the last great decade of Democratic administrations—was an event of great importance, and the ship was always crowded with admiring visitors. The fame of American ships was known wherever the waves rolled and the winds blew, and for grace, beauty, speed, safety and endurance they were unequalled.

Contrast the foregoing statement of our maritime conditions with those of the present: Today American ships are all but unknown in the ports of the world. In most of the ports of the continent of Europe an American ship is never seen, and of the thousands of ships and millions of tons that pass through the Suez canal one under the American flag is the greatest of rarities. Such, in short, is the low state to which a once great interest, an industry of vast extent and large profit, has fallen under Republican neglect and misrule.

The Republican party has lacked the courage to apply the protective policy to our shipping which it believes to be necessary for its restoration. Its beloved subsidy policy, a policy that would take millions and tens of millions from the national treasury for the benefit of a limited number of trust-ridden steamship owners, a policy so extravagant and withal so uncertain as to its beneficial results to the nation as to appal some of the more conservative and less greedy of its followers, has been promised them, but it has not been given because of the sturdy and unyielding opposition of the Democratic party, although in a minority. The Republican party believes in subsidies, because by such a policy, so arranged as to confer the greatest benefits upon corporations from which the largest campaign funds can be most easily wrung, the national treasury may be used to reimburse and still further enrich those favored beneficiaries, the trust magnates and the millionaires.

The subsidy bill which the Republicans jammed through the United States Senate on March 17, 1902, carried in its provisions many millions of dollars annually for rich and powerful owners of swift steamships, but all vessels under a thousand tons—the small craft owned by the common people, the small builders, the sailmakers, the outfitters, the men whose labor constructed them, the masters, officers and seamen who sail them, their widows and orphans of limited means—all of these were ruthlessly denied any share in that subsidy lest their competition should possibly give some annoyance and inconvenience to the trust-controlled steamships.

That remnant of our small tonnage which the competition of heavily subsidized foreign shipping has failed to destroy would thus be ruined by the large and powerful corporations owning subsidized American shipping—that was the mockery of assistance which the Republican party offered to the American owners of vessels under one thousand tons—subsidies for their larger American competitors, but nothing for the American tonnage owned in small shares by individuals of moderate means.

Hard as is the lot of the small vessel owner, limited as are his opportunities for making headway against the larger and richer corporations with which he competes, severe and crushing as are the losses that fall upon him because of his inability to pay the excessive insurance rates demanded by the underwriters whose directorates are filled with his strongest competitors, it was provided in that infamous Republican ship subsidy bill that such feeble competition should no longer be possible, and that a summary end should be put to a class of tonnage which develops and nurtures the sturdiest seamen, the very flower of courage and skill, most useful as men-of-war's-men, the most valuable—indeed, the priceless—resource of the navy in time of need. Thus, instead of the

mercantile marine being the nursery of our armed navy, the American sailor was to be smothered in his cradle.

The Democratic party is pledged to restore American shipping, but not by the exotic and corrupting assistance of the national treasury, not by one-sided subsidies and bounties, not by expedients which rob the many for the benefit of the few.

TRADE NOTES.

The Lunkenheimer Co. of Cincinnati have prepared a most comprehensive display of a large line of high grade engineering specialties which they manufacture and are now exhibiting them at the World's Fair.

The East End Boiler Works, Detroit, Mich., have just shipped to the Electric Co., Mitchell, S. D., a 210-H. P. water-tube boiler, 18 ft. long, 9 ft. 6 in. wide and 10 ft. 6 in. high. They also have under construction a 50-H. P. for a Tacoma, Wash., concern.

The Friederich Stadt ship yard of J. & A. Jensen at Dahl, Christiana, one of the largest in Norway, have adopted a Haeseler pneumatic hammer and drills and have placed a two-year contract with the Ingersoll Sargeant Drill Co. covering their requirements.

The Reliance Mfg. Co. have removed their plant from City Island, N. Y., to Providence, R. I. To their gas engine business they have also added the manufacture of refrigerating machines of from 1 to 5 tons capacity. The new plant at Providence has three times the capacity of the old one.

"The Gateway to Economy and Profit" is the title of two show cards that are being sent to the trade by the H. W. Johns-Manville Co., 100 William street, New York. One card shows several casts of plating including Kearsarge, Mobiline and Vulcabeston in the actual colors of the goods, and the other card shows "Asbestos fire felt," "85 per cent Magnesia," "Asbestocel" and other pipe and boiler coverings. The cards will be mailed to anyone upon application.

The Falls Hollow Staybolt Co., Cuyahoga Falls, O., have issued a card to the effect that the Falls Hollow staybolt iron is the only elastic staybolt in the world and make the following claims for it: The only staybolt iron which responds in service to the expansion and contraction of fire box; the only staybolt iron which relieves the material in molecular strains; the only staybolt iron which is self protective from burning; the only staybolt iron which does not make the side sheets crack; the only staybolt iron which earns its own cost in oxygen through it to the fire; the only staybolt iron always sure of giving warning of breakage; the staybolt which lasts longest, causes least repairs, gives longest life to the fire box and the longest service in the engine on the rails.

The Akron Chilian mill for the wet grinding of metalliferous rock is the title of the latest catalogue put out by the Wellman-Seaver-Morgan Co. of Cleveland. The distinguishing features of the mill are said to be: First, the possibility of adjusting the rollers while the mill is in operation; second, the arrangement of the principal bearings so that they can readily be examined and repaired; third, an efficient system of lubrication, and disposal of waste oil; fourth, high efficiency as regards output, water consumption, wear and tear; fifth, even distribution of feed and large screen capacity; sixth, substantial construction combined with easy access for making repairs. The wash drawings throughout the catalogue are printed in black, while the letter press is in brown. The catalogue gives a complete description of the mill and will be sent to anyone interested.

OBITUARY.

James C. Lewis who died suddenly at his home in Detroit, Sunday night last, was a well-known marine engineer, having served in that capacity on the old Grummond Line and on different tugs of the Grummond fleet. He was also an engineer

on one of the steamers of the Detroit, Belle Isle & Windsor Ferry Co. for several years.

Archer Brown of the firm of Rogers, Brown & Co., well known pig iron merchants of New York, died at his residence in East Orange last week. Mr. Brown was fifty-two years old. He began his life as a newspaper man, but about twenty years ago organized the firm of Rogers, Brown & Co., which has since become famous in the pig iron industry.

ITEMS OF GENERAL INTEREST.

The following transfers have been made through the office of Stanley M. Seaman, yacht broker, New York city: Auxiliary cat boat Keystone, Mr. E. M. Bull to Mr. Fredk. T. Mason, New London, Conn.; sloop Kangaroo, Mr. O. F. Smith to Mr. C. W. Wright of Brooklyn, N. Y. Jib and mainsail Knave, Mr. W. N. Bavie to Mr. E. Hope Norton of New York.

The establishment of the second navy yard somewhere on Puget Sound is favored by Rear Admiral Mordecai T. Endicott, chairman of the bureau of yards and docks of the navy department. Admiral Endicott believes that the new yard should be conveniently near to some central population and also to have adequate railroad facilities in order to make it a great repair establishment.

Mail advices from Liverpool state that the report of the directors of the Prince Line for the year ending June 30, 1904, shows a gross profit amounting to £104,553 10s. 11d. from which is to be deducted for repairs and renewal £22,118 9d., leaving a balance of £82,435 10s. 12d. The sum of £43,647 17s. 6d. is set aside and a dividend of 5 per cent was declared. The report is that the shipping business continues very depressed.

Plans are being prepared by the leading underwriters of the Pacific coast for the incorporation of a salvage association on the lines of similar organizations elsewhere. It is understood that the shares will be held entirely by underwriters. The plan is to establish a plant on Puget Sound and another at San Francisco, each of which will have a competent salvage officer in charge. Ship owners in particular will appreciate the importance of this new venture in view of the fact that there is at present no complete salvage plant on the Pacific coast.

The American Ship Windlass Co. is furnishing complete outfits for several schooners now building in Atlantic coast yards. The schooner Catherine M. Monahan being built by M. C. McDonald at Mystic, Conn., will be furnished with a Providence outfit, consisting of a windlass, steam winch, pumps, boiler, tank, condenser, all set up and piped on board. The same equipment will also be furnished to the schooner Dorothy Belle building by Russell & Co. at Leesburg, N. J., and a schooner building by Wm. G. Abbott at Milford, Del., for Capt. A. T. Hudgins.

The battleship Connecticut will be launched from the New York navy yard on Thursday of this week. She is the fourth vessel of that name to be constructed for the United States navy. The Connecticut is one of the 16,000-ton battleships now building for the navy. Her sisters are the Louisiana, Vermont, Kansas and Minnesota. The general dimensions of this class are: Length, 450 ft.; extreme beam, 76 ft. 10 in.; mean draught, 24 ft. 6 in.; displacement, 16,000 tons; twin screws; vertical triple-expansion engines; speed, 18 knots; indicated horse power, 16,500; coal capacity, 2,200 tons. Her armament will consist of four 12-in. guns, eight 8-in. guns, twelve 7-in. guns, two 3-in. rapid-fire guns, twelve 3-pounders, eight 1-pounders, two 3-in. field guns, eight machine guns and four submerged torpedo tubes. Her armor belt is 11 in. thick at the top and 9 in. thick at the bottom. The thickness of the armor on the large turrets is 12 in. and for the smaller turrets 8 in. The barbette armor is 10 in. for the 12-in. guns and 6 in. for the 6-in. guns.

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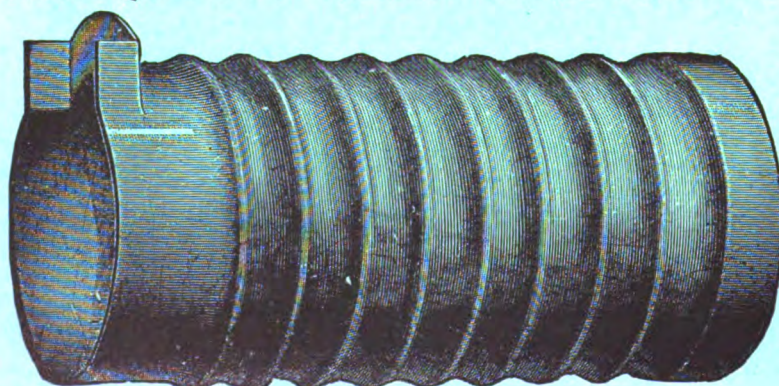
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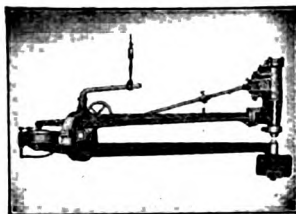
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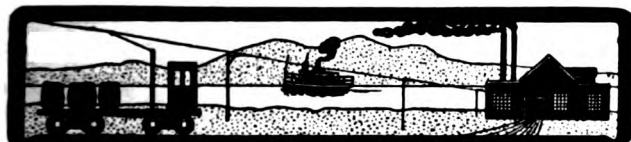
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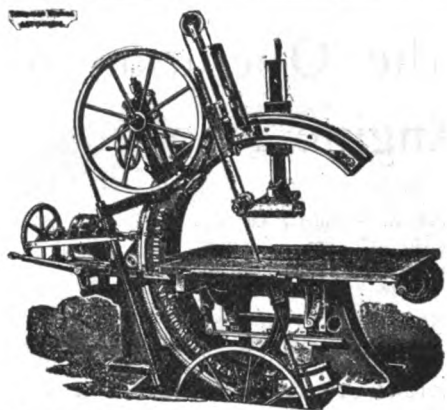
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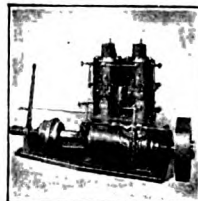
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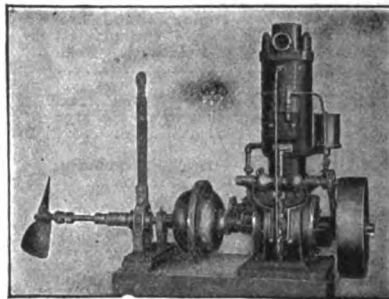
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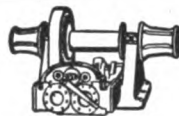
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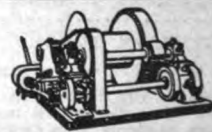
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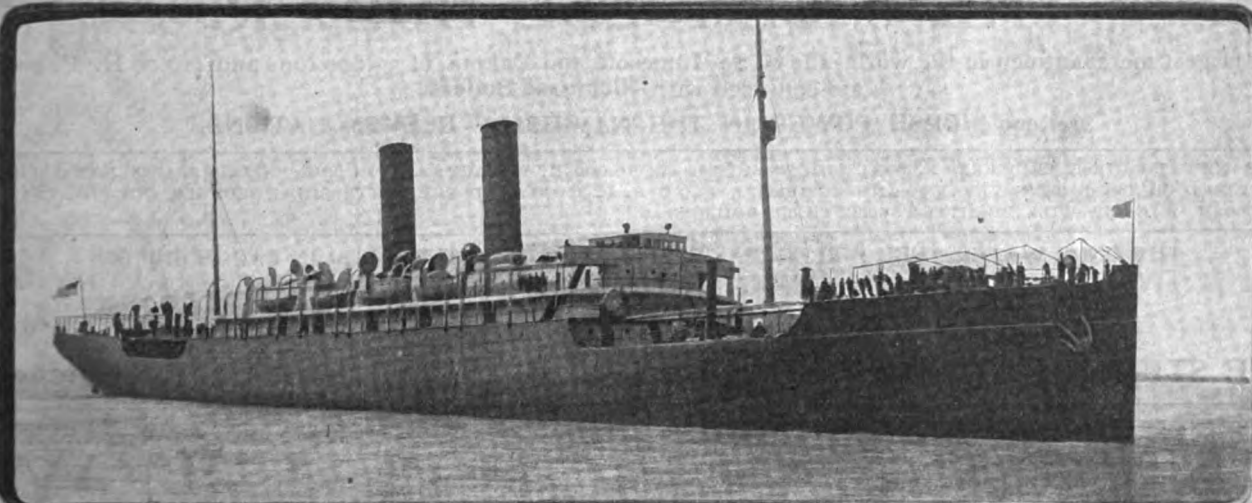
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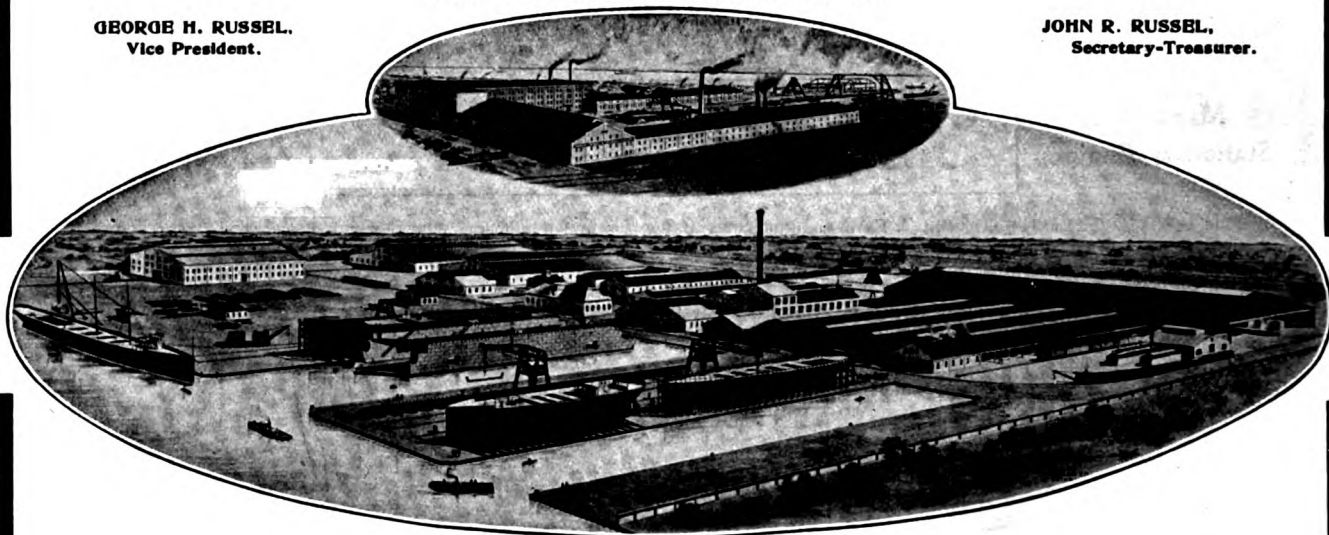
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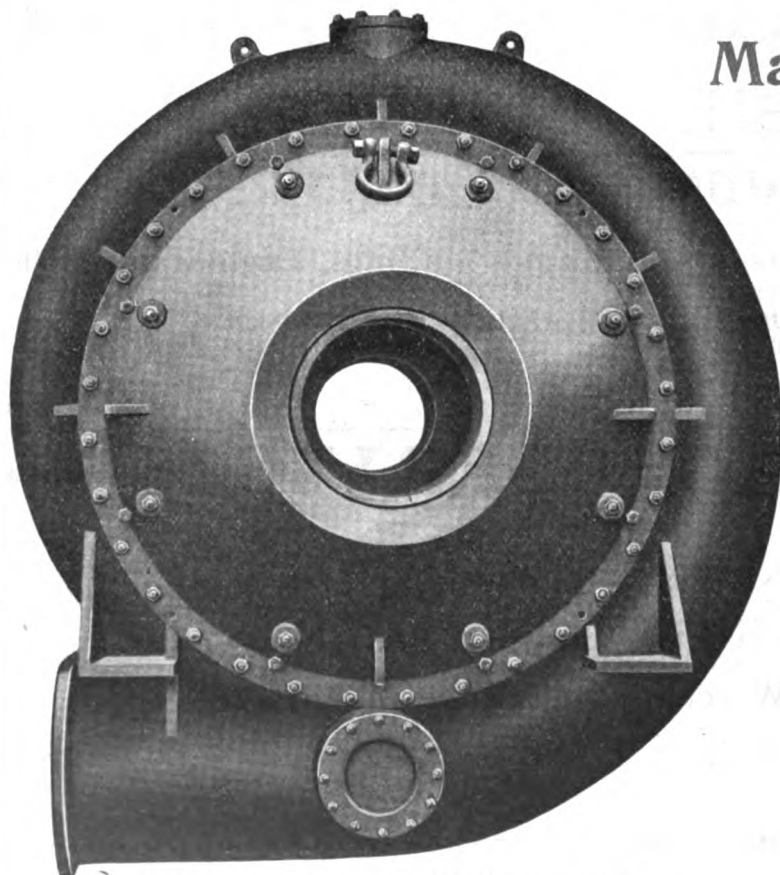
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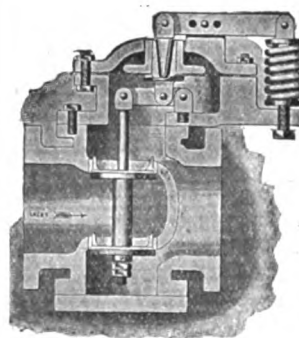
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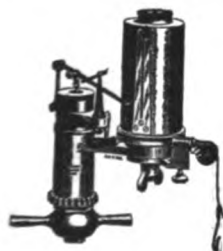
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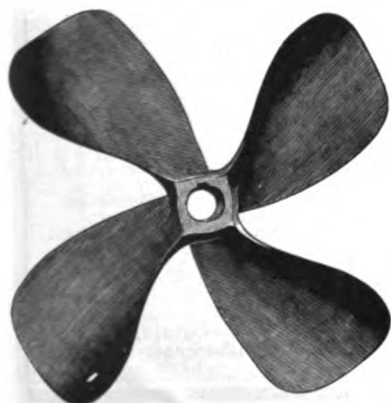
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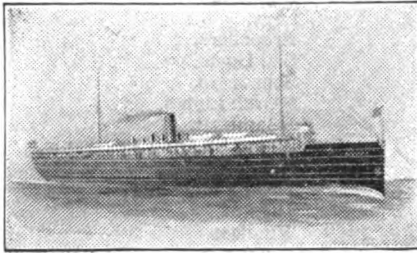
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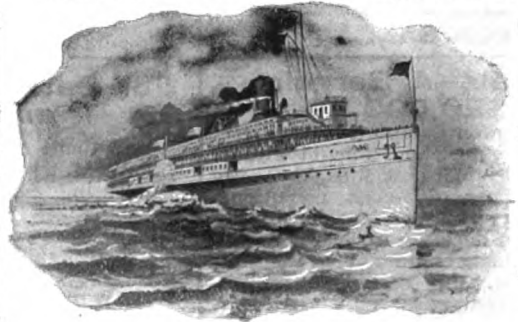
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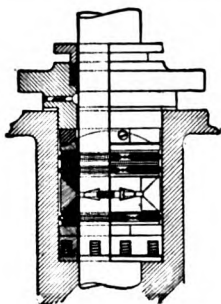
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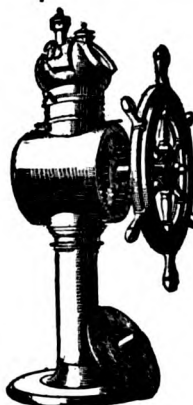
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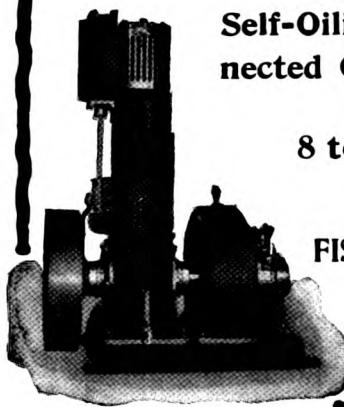
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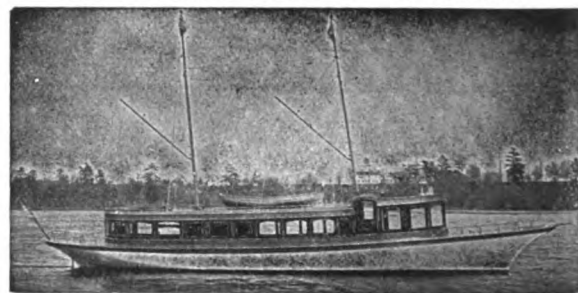
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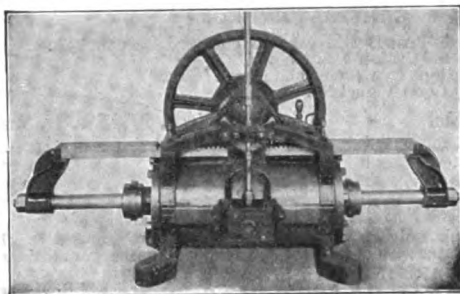
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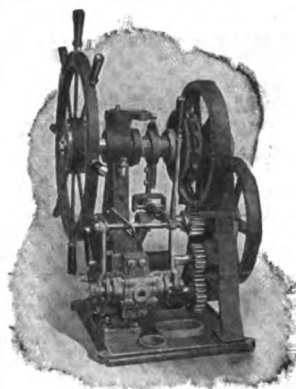
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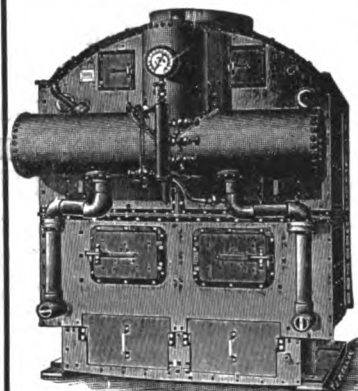
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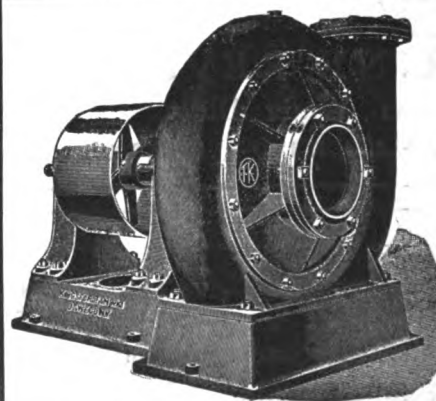
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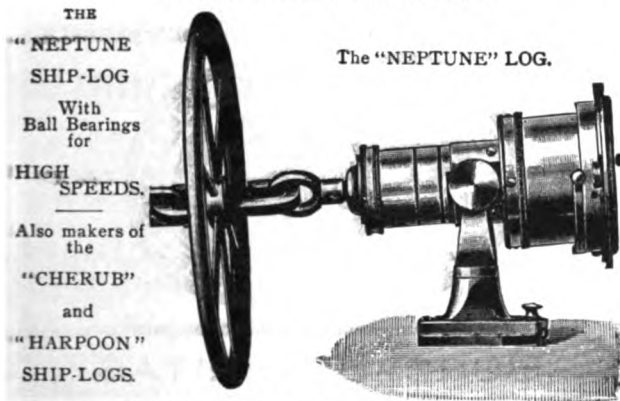


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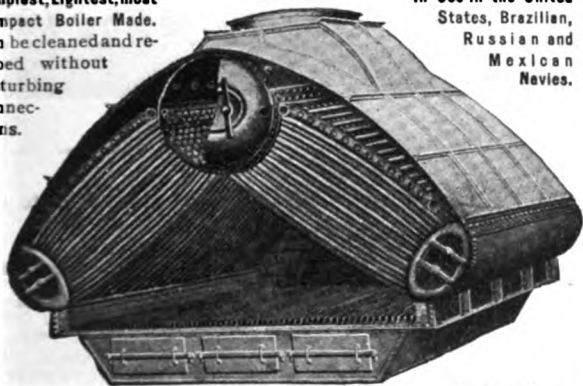
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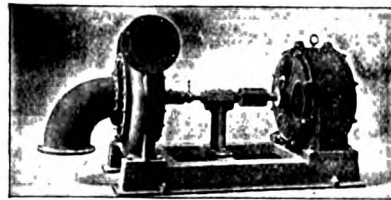
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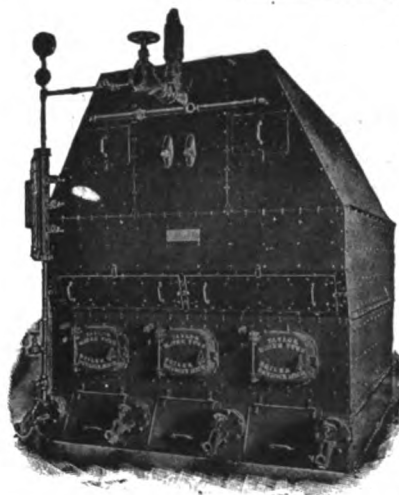
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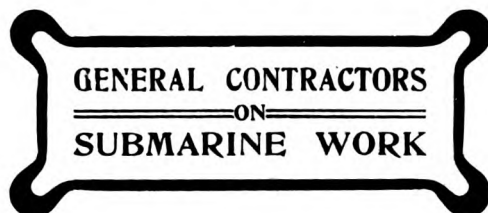
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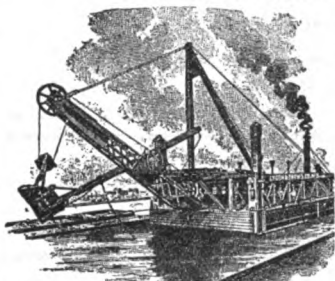
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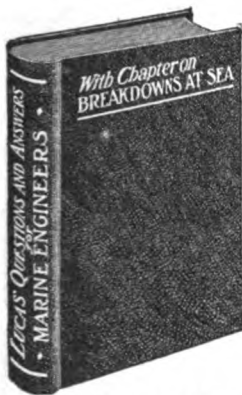
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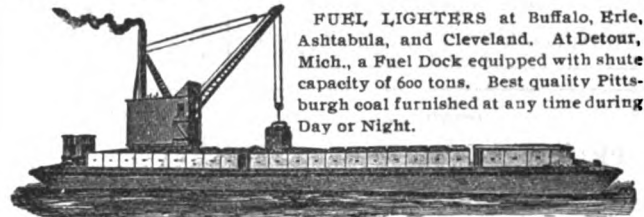
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American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros.....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Frankfort Marine, A. & P. G. Ins. Co.....
.....New York.

INSURANCE, MARINE.—Continued.

Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F. New York & Chicago.
Prindville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Voss, F. D.....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland, O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....
.....Midland, Ont.
Marine Construction & D. D. Co.....
.....Marine's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D.....New York

LIGHTS, SIDE AND SIGNAL.

Russell & Watson.....Buffalo.

LOGS.

Walker & Sons, Thomas.....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co.....Chicago.
Lunkenheimer Co.....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.

MACHINISTS.

Chase Machine Co.....Cleveland.
Hickler Bros.....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Union Machine & Boiler Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

MARINE GLUE.

Ferdinand & Co., L. W.....Boston, Mass.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

MELTING POT AND PAYING LADLE.

(For Paying Seams of Decks with Marine Glue.)

Ferdinand & Co., L. W.....Boston.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Hyde Park, Mass.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

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NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, AlexanderCleveland.
 Kidd, JosephDuluth, Minn.
 Kreer & ParsonsChicago.
 Lovejoy, H. O.Buffalo.
 Matteson & DrakePhiladelphia.
 Mosher, Chas. D.New York.
 Nacey, JamesCleveland.
 Rice, HenryBuffalo.
 Sadler, Perkins & FieldNew York.
 Steel, AdamCleveland.
 Wood, W. J.Chicago.

OAKUM.

DeGrauw, Aymar & Co.New York.
 Stratford, Oakum Co.Jersey City, N. J.

OIL ENGINES.

Mietz, Aug.New York.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.Jersey City, N. J.
 Standard Oil Co.Cleveland.

PACKING.

Crane Co.Chicago.
 Jenkins Bros.New York.
 Katzenstein, L. & Co.New York.
 New York Belting & Packing Co.New York.

PACKING TOOL.

Matteson & DrakePhiladelphia.

PAINTS.

Baker, Howard H. & Co.Buffalo.
 Detroit Varnish Co.Detroit.
 Detroit White Lead Works.Detroit.
 New Jersey Zinc Co.New York.
 Upson-Walton Co.Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.Buffalo.
 Chicago & Gt. Lakes Dredge & Dock Co.Chicago.
 Dunbar & Sullivan Dredging Co.Chicago.
 Fitz-Simons & Connell Co.Chicago.
 Hickler Bros.Sault Ste. Marie, Mich.
 Lake Superior Contracting & Dredging Co.Duluth, Minn.
 Parker Bros. Co., Ltd.Detroit.
 Smith Co., L. P. & J. A.Cleveland.
 Starke Dredge & Dock Co., C. H.Milwaukee.
 Sullivan, M.Detroit.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.Cleveland, O.
 Crane Co.Chicago.
 Macbeth Iron Co.Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc.Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.Cleveland, O.
 Otis Steel Co.Cleveland.

PNEUMATIC TOOLS.

Allen, John F.New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.Boston.

PRESSURE REGULATORS.

Kieley & MuellerNew York.
 Ross Valve Co.Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.Cleveland.
 Atlantic WorksEast Boston, Mass.
 Cramp, Wm. & SonsPhiladelphia.
 Detroit Ship Building Co.Detroit.
 Fore River Shipbuilding Co.Quincy, Mass.
 Great Lakes Engineering Works.Detroit.
 Hyde Windlass Co.Bath, Me.
 Jenks Ship Building Co.Port Huron, Mich.
 Lockwood Mfg. Co.East Boston, Mass.
 Macbeth Iron Co.Cleveland.
 Milwaukee Dry Dock Co.Milwaukee.
 Newport News Ship Building Co.Newport News, Va.
 Phosphor Bronze Smelting Co., Ltd.Philadelphia.
 Roelker, H. B.New York.
 Sheriffs Mfg. Co.Milwaukee.
 Superior Ship Building Co.Superior, Wis.
 Thropp & Sons Co., J. E.Trenton, N. J.
 Trout, H. G.Buffalo.
 United States Ship Building Co.New York.

PROJECTORS, ELECTRIC.

General Electric Co.Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co.Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.New York.
 Great Lakes Engineering Works.Detroit.
 Kingsford Foundry & Machine Works.Oswego, N. Y.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.New York.

RANGES.

Russell & WatsonBuffalo.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.Detroit.
 Roelker, H. B.New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes RegisterCleveland.
 Record of American & Foreign Shipping.New York.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)
 Georgian Bay Engineering Works.Midland, Ont.
 Forest City Boiler Co.Cleveland.

RIVETING MACHINES.

Allen, John F.New York.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.Cleveland, O.

SAFETY VALVES.

American Steam Gauge & Valve Mfg. Co.Boston.
 Ashton Valve Co.Boston.
 Crane Co.Chicago.
 Lunkenheimer Co.Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.Buffalo.
 Upson-Walton Co.Cleveland.
 Wilson & SilsbyBoston.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co.Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne Fuller Co.Cleveland, O.
 Otis Steel Co.Cleveland.

SHIP BUILDERS.

American Ship Building Co.Cleveland.
 Atlantic WorksEast Boston, Mass.
 Bertram Engine Works Co., Ltd.Toronto, Can.
 Buffalo Dry Dock Co.Buffalo.
 Cramp, Wm. & SonsPhiladelphia.
 Craig Ship Building Co.Toledo, O.
 Chicago Ship Building Co.Chicago.
 Detroit Ship Building Co.Detroit.
 Fore River Shipbuilding Co.Quincy, Mass.
 Great Lakes Engineering Works.Detroit.
 Jenks Ship Building Co.Port Huron, Mich.
 Lockwood Mfg. Co.East Boston, Mass.
 Manitowoc Dry Dock Co.Manitowoc, Wis.
 Milwaukee Dry Dock Co.Milwaukee.
 Newport News Ship Building Co.Newport News, Va.
 Roach's Ship YardChester, Pa.
 Shipowner's Dry Dock Co.Chicago.
 Smith & Son, Abram.Algonac, Mich.
 United States Ship Building Co.New York.
 Willard, Chas. P. & Co.Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co.Buffalo.
 Marine Mfg. & Supply Co.New York.
 Upson-Walton Co.Cleveland.

SHIP DESIGNERS.

Kidd, JosephDuluth.
 Kreer & ParsonsChicago.
 Matteson & DrakeBuffalo.
 Rice & LovejoyBuffalo.
 Steel, Nacey & HyndCleveland.
 Wood, W. J.Chicago.

SHIP LANTERNS AND LAMPS.

Russell & WatsonBuffalo.

SHIP TIMBER.

Martin-Barriss Co.Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Gilchrist & Co., C. P.Cleveland.
 Holmes, SamuelNew York.
 Lester, S. S.Quebec, Can.
 McCarthy, T. R.Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American LineNew York.
 Anchor LineBuffalo.
 Boston Steamship Co.Boston.
 Cleveland & Buffalo Transit Co.Cleveland.
 Detroit & Cleveland Line.Cleveland.
 Erie & Western Trans. Co.Buffalo.
 Goodrich Trans. Co.Chicago.
 International Mercantile Marine Co.Philadelphia.
 Manitou Steamship Co.Chicago.
 Mexican-American S. S. Co.New Orleans, La.
 New York & Cuba Mail S. S. Co.New York.
 Niagara, St. Catharines & Toronto Ry. & Nav. Co.St. Catharines, Ont.
 Northern Michigan Trans. Co.Chicago.
 Red Star LineNew York.
 Richelieu & Ontario Nav. Co.Montreal, Can.
 United Fruit Co.Boston.

STEEL CASTINGS.

Macbeth Iron Co.Cleveland.
 Otis Steel Co.Cleveland.

STEERING APPARATUS.

American Ship Building Co.Cleveland.
 Chase Machine Co.Cleveland.
 Dake Engine Co.Grand Haven, Mich.
 Detroit Ship Building Co.Detroit.
 Hyde Windlass Co.Bath, Me.
 Jenks Ship Building Co.Port Huron, Mich.
 Marine Mfg. & Supply Co.New York.
 Moulton Steering Engine Co.New York.
 Pawling & HarnischfegerMilwaukee.
 Sheriffs Mfg. Co.Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.Boston.
 Schrader's Son, A.New York.

SURVEYORS, MARINE.

Gaskin, EdwardBuffalo.
 Hynd, AlexanderCleveland.
 Lovejoy, H. O.Buffalo.
 Matteson & DrakePhiladelphia.
 Parker Bros. Co., Ltd.Detroit.
 Nacey, JamesCleveland.
 Rice, HenryBuffalo.
 Steel, AdamCleveland.
 Wood, W. J.Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.Chicago.
 Pittsburg Testing Laboratory, Ltd.Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F.New York.
 Watson-Stillman Co.New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.Providence, R. I.
 Chase Machine Co.Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co.Kingston, Ont.
 Great Lakes Towing Co.Cleveland.
 Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & MuellerNew York.
 Lunkenheimer Co.Cincinnati.
 Sturtevant Co., B. F.,Hyde Park, Mass.

TRUCKS.

Boston & Lockport Block Co.Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.Pittsburg, Pa.

Buyers' Directory of the Marine Trade.—Continued.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge & Valve Mfg. Co. Boston.
Ashton Valve Co. Boston.
Crane Co. Chicago.
Jenkins Bros. New York.
Kieley & Mueller New York.
Lunkenheimer Co. Cincinnati.
Ross Valve Co. Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. Troy, N. Y.

VARNISHES.

Detroit Varnish Co. Detroit.
Detroit White Lead Works. Detroit.
New Jersey Zinc Co. New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. Hyde Park, Mass.

VESSEL AND FREIGHT AGENTS.

Boland, John J. Buffalo.
Brown & Co. Buffalo.
Elphicke, C. W. & Co. Chicago.
Fleming & Co., P. H. Chicago.
Gilchrist & Co., C. P. Cleveland.
Hall & Root Buffalo.
Helm & Co., D. T. Duluth.

VESSEL AND FREIGHT AGENTS—Con.

Hawgood & Co., W. A. Cleveland.
Holmes, Samuel New York.
Hutchinson & Co. Cleveland.
Lester, S. S. Quebec, Can.
McCarthy, T. R. Montreal.
Mitchell & Co. Cleveland.
Parker Bros. Co., Ltd. Detroit.
Prindiville & Co. Chicago.
Richardson, W. C. Cleveland.
Sullivan, D. & Co. Chicago.

WATER GAUGES.

Bonner & Co., Wm. T. Boston.
Lunkenheimer Co. Cincinnati, O.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. Buffalo.
DeGrauw, Aymar & Co. New York.
Upson-Walton Co. Cleveland.

WHISTLES, STEAM.

American Steam Gauge & Valve Mfg. Co. Boston.
Ashton Valve Co. Boston.
Lunkenheimer Co. Cincinnati.

WINDLASSES.

American Ship Windlass Co., Providence, R. I.
American Ship Building Co., Cleveland.
Hyde Windlass Co., Bath, Me.
Jenks Ship Building Co., Port Huron, Mich.
Marine Mfg. & Supply Co., New York.

WINCHES.

American Ship Windlass Co., Providence, R. I.
Georgian Bay Engineering Works.
Hyde Windlass Co., Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc., Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co., Kingston, Ont.
Great Lakes Towing Co., Cleveland.
Midland Towing & Wrecking Co., Ltd., Midland, Ont.
Parker Bros. Co., Ltd., Detroit.

YACHT AND BOAT BUILDERS.

Bertram Engine Works Co., Ltd., Toronto, Can.
Drein, Thos. & Son, Wilmington, Del.
Georgian Bay Engineering Works, Midland, Ont.
Truscott Boat Mfg. Co., St. Joseph, Mich.
Willard, Chas. P. & Co., Chicago.

YAWLS.

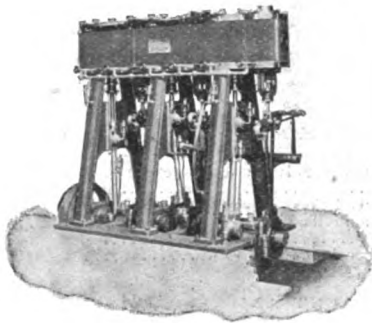
Drein, Thos. & Son, Wilmington, Del.

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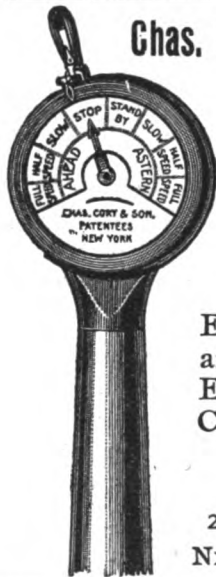
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John A. Flajole, Gen'l Mgr.

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The Marine Review, Cleveland, O.



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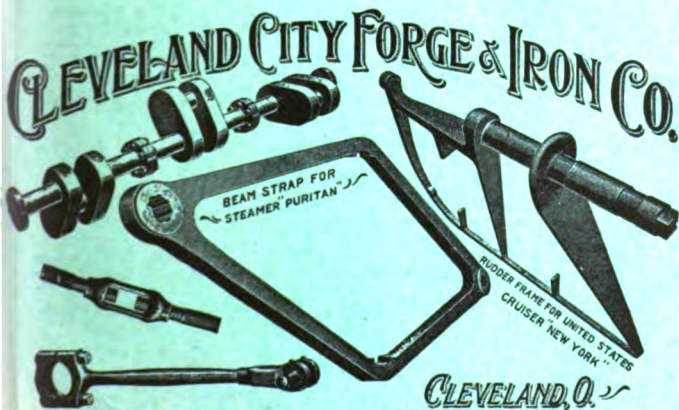
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Anchors were considered, the ...

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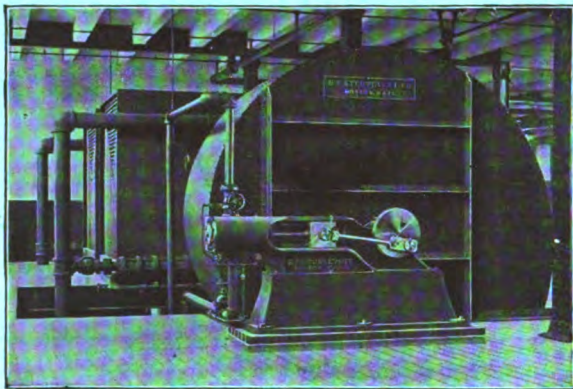
The Baldt Anchor Co., Chester, Pa.

LAKE SHORE AND MICHIGAN SOUTHERN RY.

Eastward	Arrive from West	Depart East
No. 18, Southwestern Limited .....	.....	*1:50 a.m.
No. 22, Lake Shore Limited	*2:12 a.m.	*2:20 a.m.
No. 20, Chicago and Cleveland Exp.	*7:20 a.m.	.....
No. 28, New York and Boston Exp.	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom.	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky	†1:40 p.m.	.....
No. 42, Boston-New York Express .....	.....	*11:45 a.m.
No. 44, Cleveland and New York Spl. ....	.....	*3:00 p.m.
No. 46, Southwestern Express .....	.....	*3:10 p.m.
No. 116, Ashtabula Accommodation .....	.....	†4:30 p.m.
No. 6, Limited Fast Mail	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl.	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express	†9:10 p.m.	†9:25 p.m.
No. 126, Norwalk Accommodation	†7:55 a.m.	.....
Westward	Arrive from East	Depart West
No. 7, Exposition Limited	*12:50 a.m.	.....
No. 11, Southwestern Limited	*2:55 a.m.	.....
No. 9, Day Express .....	.....	†6:10 a.m.
No. 15, Boston and Chicago Special	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express	*10:30 a.m.	*10:35 a.m.
No. 29, Southwestern Special	†11:10 a.m.	.....
No. 33, Southwestern Express	*12:25 p.m.	.....
No. 133, Cleveland and Detroit Exp. ....	.....	*12:45 p.m.
No. 47, Accommodation	†11:00 a.m.	†3:00 p.m.
No. 141, Sandusky Accommodation .....	.....	†3:10 p.m.
No. 43, Fast Mail	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation .....	.....	†5:10 p.m.
No. 37, Pacific Express	*6:50 p.m.	*7:20 p.m.
No. 3, Fast Mail Limited	*10:50 p.m.	*10:55 p.m.
No. 115, Ashtabula Accommodation	*8:30 a.m.

*Daily. †Except Sunday. ‡Except Monday.
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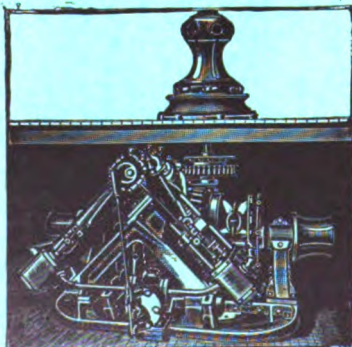
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